Influence of Business Model Innovation and Competitive Strategy

on Performance of Dutch High-Tech Startups

by

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Executive Summary

This master's thesis examines the effects of business model innovation and competitive strategies on the success of high-tech startups in the Netherlands. Understanding how high-tech startups can improve their performance and compete successfully is of utmost relevance given the increasing importance of technology entrepreneurship and the emergence of high-tech startups. High-tech businesses frequently fail within the first 18 months despite their promise; thus, it is necessary to identify techniques that encourage their expansion and success. Considering its significance in Europe and its ability to promote international entrepreneurship, this study concentrates on the Dutch high-tech startup ecosystem. By examining the interaction between business models, competitive strategies, and startup performance, the study seeks to fill a gap in the body of existing literature. The central research question, "What is the influence of competitive strategies and business model innovation on the performance of high-tech start-ups in the Netherlands?" serves as the focus of this study.

The study employs a quantitative research approach to gather insights from high-tech businesses established between 2017 and 2020. Data is meticulously collected from high-tech startups in the Netherlands, utilizing a meticulously crafted survey questionnaire. This comprehensive analysis aims to unravel the intricate dynamics between business model innovation and competitive strategies, shedding light on pivotal performance variables such as number of employees and revenue, pivotal indicators of startup growth. Through rigorous statistical analysis performed on a sample of 49 high-tech startups, the study unveils a noteworthy positive correlation between the interaction of business model novelty and cost-leadership strategy with enhanced startup performance, particularly in terms of full-time employees. However, other direct and interactional relationships failed to yield significance concerning the performance variables. Consequently, the study delves into discerning the prevalent business models and preferred competitive strategies within the Dutch high-tech startup ecosystem. Further, despite the significant insights garnered, this research acknowledges certain limitations, including sample size constraints, sampling methodology, and primarily the questions in the survey questionnaire design, which may have influenced the outcomes of the research study.

The results of this study have ramifications for practitioners as well as scholars. By providing insights into the intricate interactions between business models, competitive strategies, and startup performance, it adds to the body of academic literature on strategic management and entrepreneurship. The research also provides important insights from high-tech startups on their decision-making to enhance their performance with developing market trends. The research helps business owners make informed decisions that promote growth, profitability, and market competitiveness by identifying effective combinations of business models and strategies. Delving into these dynamics, this research not only enriches the academic understanding of entrepreneurship but also provides valuable insights with practical implications. Through its rigorous analysis and findings, this thesis aims to equip high-tech startups with the knowledge and strategies needed to succeed in today's dynamic world. In conclusion, this master's thesis provides a thorough examination of the complex linkages between business model innovation, competitive strategies, and the performance outcomes of Dutch high-tech startups.

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Nomenclature

This section includes the Abbreviations used throughout the report.

Abbreviations

Abbreviation	Definition
BM	Business Model
CS	Competitive Strategy
BMC	Business Model Canvas
BMI	Business Model Innovation
FTE	Full Time Equivalent Employees
EFA	Exploratory Factor Analysis
CATI	Computer Assisted Telephone Interviewing
BMA	Business Model Ambidexterity
SD	Standard Deviation

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Introduction

1.1. Background

Businesses have been competing against each other in order to capitalize on the existing market. With increasing advancement in technology and technology entrepreneurship over recent years, striving to stay on top by driving innovation by introducing new products and services to benefit customers and enhance the country's economic growth has become essential for businesses [Matejun, 2016]. This rise in technology and entrepreneurship has resulted in a significant rise of high-tech startups over the last decade and across all industries, contributing to the national economy.

By incorporating these advanced technologies in their products and services, high-tech startups are competing with established firms and forcing them to innovate further to meet the dynamic customer requirements. Even though these high-tech startups are offering competition to other businesses (new ventures and established firms), their survival rate is relatively low [Song et al., 2008]. Behnke and Kibbel [2017], in this context, highlights that, despite these startups being inventive and adaptable in their operations, nine out of ten fail, with eight collapsing within the first 18 months. As high-tech startups experience higher failure rates than expected by the industry [Gage, 2012], it is, therefore, crucial to provide appropriate assistance to these startups in their early stages of growth so that they can capitalize on growth opportunities to enhance their performance. Despite Europe housing numerous high-tech companies, European firms underperform relative to those in other major countries; they develop more slowly, generate lower returns, and invest less in R&D than their US counterparts. However, in Europe, the Netherlands is regarded highly on various indicators of start-up success [Henz et al., 2022]. This article highlights that the Dutch startup ecosystem ranks fourth in Europe and has the potential to become not just a regional leader but also the driving force that propels Europe to the forefront of global entrepreneurship.

The landscape of high-tech startups is characterized by intense competition and rapid technological advancements to drive growth. This dynamic environment poses significant challenges as startups must contend with fluctuating market conditions, the emergence of new technologies, competition, and evolving customer preferences, necessitating startups to be flexible and adaptive to the changing situation to succeed. Despite their potential of being

versatile, many startups struggle to scale up or maintain consistent profitability and growth [Bala Subrahmanya, 2022]. In response to the proliferation of high-tech startups, strategic management studies have seen a surge in literature focused on accelerating startup growth and fostering success.

The strategic management literature shows that startups have been using a variety of strategies to thrive and grow, including developing new business models, Lambert and Davidson [2013] and implementing various technological innovations [Danarahmanto et al., 2020]. Thus implying the fundamental requirements for a company's existence are a business model and a business strategy. A business model explains and describes how a firm operates and generates revenue. While, a business strategy outlines and justifies the why, where, and how the business model will be implemented [Štefan and Branislav, 2016]. With the increasing literature, management professionals are starting to identify the difference between business models and business strategies and the importance of business models and competitive strategies for firm performance [Gluck et al., 2022].

Scholars, Teece [2007] and Chang and Lee [2008] emphasize the importance of innovation, while Lüdeke-Freund [2013] underlines the importance of the business model, for startups to attain sustainable performance. In this regard, despite these assertions, empirical evidence indicates a different reality: many newly founded organizations fail in their expansion efforts despite developing a robust business model and executing a variety of revolutionary ideas. This paradox highlights the complexities of generating long-term development, emphasizing the significance of understanding the intricate relationships between innovation, business models, and other elements propelling firm performance.

Various authors have researched the different Business Model's (BM's) and Competitive Strategies [1] (CS) and suggest the use of appropriate BM and CS, with respect to market trends and time of market entry, will help startups in achieving an increase in firm performance (gaining a competitive advantage and market position) [Zott and Amit, 2008; Balboni et al., 2019; Saebi et al., 2017]. Startups, thereby, focus not only on generating revenue [Willemstein et al., 2007] but also devote their attention to other core business activities (for example, creating a competitive business model) to grow and compete. As a result, startups frequently make use of a business model to describe all of their ongoing activities. Hence, selecting or creating a certain business model is a crucial strategic decision that entrepreneurs make to position themselves within the industry [Willemstein et al., 2007].

1.2. Research Gap

Disruptive technological innovations, despite being novel, do not create value on their own, but it is up to the organization to create a viable business model to commercialize their unique ideas and technologies [Chesbrough, 2010; Teece, 2010; Demil and Lecocq, 2010], such that it creates value for both the stakeholders involved and the business itself. Creating and capturing this value has become more essential for organizations, as drivers like globalization, deregulation, and technological change are thoroughly changing the competitive game. Moreover, both academics and business professionals concur that the companies that are growing the quickest in this competitive environment are those who have escalated their focus more on the fundamentals (core structure) of the business models in order to compete 'differently' [Casadesus-Masanell and Ricart, 2010].

[1] In this research, the term "business strategy" is referred to competitive strategy

Consequently, the topic of business models and competitive strategy is growing its roots in the strategy and management literature, as firms constantly look for options that will propel them to the top. With the emergence of new businesses, organizations are using the business model to solve the various challenges they face when trying to capture and create value [Osterwalder et al., 2005; Zott et al., 2011]. The business model not only acts as an infrastructure to understand better the relationship between the value created and captured but also provides a foundation for organizations to upgrade (business model innovation) their business model in line with the market demand.

Strategically selecting and verifying the business model (so that the company benefits in terms of market dominance) in-house does not necessarily guarantee its success in creating and capturing value [Ricart and Casadesus-Masanell, 2011]. Balancing the value creation, value delivery, and value capture in a business model would aid firms in experiencing profitability [Teece, 2018]. This implies that the strategy implemented should be based on the business models' characteristics of creating value for both the customer (solving the problem) and the business (generating profit). With the right business model and market strategy, corporations can generate network effects to aid in their quest for market control [Ricart and Casadesus-Masanell, 2011].

To ascertain how the business model design of new ventures impacts their success, Zott and Amit [2007] initially applied their developed framework examining the relationship between business models and firm performance. Subsequently, various researchers (e.g., Patzelt et al. [2008]; Brettel et al. [2012]; Hu and Chen [2016]; Pucci et al. [2017]) utilized the same framework to investigate the behavior of both startups and established organizations. These studies explored the influence of business models on firm performance, confirming a significant relationship between the two. However, this relationship was not universally observed for different business models and business settings (by examining across geographical regions), and the authors indicated that business models alone do not dictate firm performance but require appropriate strategic choices to ensure optimal performance.

Empirical studies on the topic of business model innovation and competitive strategy are expanding rapidly, primarily because start-ups, venture capitalists, and policymakers are all trying to figure out whether certain BM's or certain traits might improve the odds of survival and overall performance of startups [Christensen et al., 2016]. Multiple researchers have conducted empirical analyses within the domain of BM's and CS to answer the ambiguities arising. Their findings suggest the necessity for additional empirical research to fully comprehend the influence of business model innovation and competitive strategies on firm performance [Bashir and Verma, 2017]. This demonstrates a need for an increasing understanding of the complexities in managing dynamics within business settings, prompting a call for more rigorous research to inform strategic decision-making processes.

As a strategy is used to implement the business model, the interaction effect between business model innovation and competitive strategy on firm performance is vital. This research will thereby provide firms with successful combinations of business models and strategies that can help improve their performance. Zott and Amit [2008] performed research on the direct and interaction effect of BM and CS on firm performance and found significant results claiming there is a relationship and their combination affects the firm performance. However, not many authors have researched this topic, but not specifically for Dutch high-tech startups. Despite this growing body of research on business model innovation and competitive strategies, there is a notable gap in the literature regarding their influence on the performance of startups in the

Netherlands. Therefore, this study aims to fill this research gap and contribute to the existing literature by examining the relationship between BM, CS, and the performance of high-tech startups in the Netherlands. High-tech startups were chosen as the focus of this study due to the significant support and growth of the high-tech startup ecosystem in the Netherlands, and because most research in the field of business model innovation and competitive strategies has been conducted on established firms and small and medium-sized enterprises (SMEs) [Zott and Amit, 2008; Gronum et al., 2016; Balboni et al., 2019]. This research thus aim to illuminate the specific context of high-tech startups in the Netherlands, offering valuable insights for both academia and practitioners. By examining whether the influence holds true for Dutch high-tech startups and assessing the impact of their combination, if any, it seeks to contribute to a deeper understanding of the dynamics at play in this particular setting.

1.3. Research Question

What is the influence of competitive strategies and business model innovation on the performance of high-tech start-ups in the Netherlands?

The research question aims to examine the impact of competitive strategies and business model innovation on the performance of Dutch high-tech startups. It seeks to understand how various competitive strategies, such as cost leadership and differentiation, as well as business model innovation, including novelty-centered and efficiency-centered [2], that affect the growth, profitability, and overall performance of high-tech startups in the Dutch entrepreneurial environment. The study intends to provide insights into the strategic choices and business model considerations that contribute to the success and competitiveness of high-tech startups in the Dutch market by examining this relationship.

1.3.1. Sub-Research Questions

Sub-research questions are framed to provide a comprehensive understanding of the factors influencing the performance of Dutch high-tech startups. These sub-research questions align with the main research question and aim to delve into specific aspects of business model innovation, competitive strategies, and their impact on startup performance. Four sub-research questions were framed:

SRQ1: *How does the implementation of business model innovation affect the performance of high-tech start-ups?*

SRQ2: *How does the implementation of competitive strategies affect the performance of high-tech start-ups?*

SRQ3: *What are the most common competitive strategies and business model themes used by high-tech start-ups in the Netherlands?*

SRQ4: *Which business models and competitive strategies would yield a boost in the performance of high-tech start-ups in the Netherlands?*

[2] In this context, ”Novelty-centered” and ”Efficiency-centered” business models are equivalent to ”BM novelty” and ”BM efficiency,” respectively. Authors have utilized both notations interchangeably to denote these specific types of business models

The first sub-research question delves into the effect of business model innovation on the performance of high-tech startups. In contrast, the second sub-research question scrutinizes the influence of competitive strategies on startup performance. By employing existing literature and theories, that establish a relationship between business model innovation, competitive strategies, and firm performance, this research aims to discern the specific impact of these variables within the Dutch context. Utilizing existing literature and theoretical frameworks, this research aims to answer the sub-research questions one and two by highlighting the link and influence of business model innovation and competitive strategies on firm performance.

The third sub-research question aims to identify the most widely employed competitive strategies and business models among Dutch high-tech startups. This examination will reveal the strategic decisions and business model designs that Dutch high-tech startups commonly use. The last sub-research question is to identify the most effective mix of business model innovation and competitive strategies for startup growth and competitiveness. The sub-research questions directly address the main research question by revealing how competitive strategies and business model innovation influence the performance of high-tech startups in the Netherlands. By identifying relevant strategies and models, this study aims to uncover the key drivers of success and offer insights into optimizing startup performance and competitiveness in the Dutch context. By uncovering new insights and examining the nuances of different strategic approaches, this research aims to provide valuable knowledge for new ventures and contribute to the broader understanding of entrepreneurship and strategic management.

1.4. Research Objective

This research aims to understand better the concepts of business model innovation and competitive strategies by looking into the most popular and widely used business model themes and competitive strategies adopted by high-tech startups in the Netherlands. Contrasting to previous research, on established firms or small and medium-sized enterprises, this research aims to extend this understanding further for the case of high-tech startups. The study aims to establish which specific business model or competitive strategy, as well as their combination, is most beneficial for Dutch high-tech startups. This study aims to discover the best practices contributing to the success and long-term growth of high-tech startups in the Netherlands via rigorous analysis and assessment.

Netherlands fostering a thriving entrepreneurial ecosystem, facilitates the rapid emergence of new high-tech startups across various industries. Building on research such as that conducted by Balboni et al. [2019] on the performance of Italian technological startups, this study investigates the impact of business models and competitive strategies on the performance of Dutch high-tech startups. By analyzing the unique context of the Dutch entrepreneurial landscape, this research aims to provide a deeper understanding of the influencing variables and the startup's growth and success strategies. This will help inform strategic decision-making and support high-tech startups' growth and global standing in the local and international markets.

This research thus looks into the effects of business model and competitive strategies on high-tech startups' performance to see if any trend stands out among the strategic choices that affect their growth performance. Startups compared to established organizations, often face resource constraints, which may initially limit financial growth. However, research indicates that startups demonstrate growth in terms of their workforce size, with employee count com-

monly used as a metric to assess performance [Balboni et al., 2019; McKelvie and Wiklund, 2010; Eisenmann, 2020], along with other financial metrics, revenue. This suggests that while startups may experience challenges in financial expansion, their ability to scale in terms of human capital is a significant indicator of their progress and potential success. Considering the possibility of interaction effect being present between the variables on the startup performance (as shown by Zott and Amit [2008]; Balboni et al. [2019]), this research also takes into look at the possible interaction effects between both business model themes and competitive strategies on the startup performance. Moreover, this analysis will check the possible combinations of business model themes and competitive strategies that affect the startup's performance.

1.5. Research Scope

The Netherlands has shown rapid advancement in adopting new technologies and promoting technology development, by providing high entrepreneurial support, to upcoming and established businesses. Due to this support and drive for technological advancements, the Netherlands has seen a high increase in the number of high-tech startups [Wesseling et al., 2020].

This entrepreneurial trend offers an opportunity to study the dynamics within the Dutch high-tech startup environment. This research focuses on the most popular and effective business models and competitive strategies adopted by high-tech startups in the Netherlands. The research looks at business model innovation as the process of making changes to the elements of the business model by startups, to counter their current situation (either competition or just improving one's business model), for enhancing their firm performance. Consequently, competitive strategies help startups gain a competitive advantage over their competition by implementing their business model to meet customer requirements.

This study considers high-tech startups founded in the Netherlands between 2017 and 2020[3]. As the number of startups is growing year on year, and most startups fail within the first 18 months, a lag time of two years can be considered considerate in the case of high-tech startups entering their products and services into the market for the first time. The high-tech startups in this research contain newly founded, legally independent firms that are run by at least one full-time entrepreneur. De-mergers and subsidiaries are not included [Block et al., 2015]. Along with this, startups that generally require more than two years to enter the market, are not considered part of the sample group. For example, a biomedical organization that is majorly involved in research and development (R&D). These types of organizations are omitted from the study because they research ground-breaking technology (e.g. treatment for curing cancer) which can take them more than two years to develop and enter the market.

1.6. Research Methodology

This research would employ a rigorous quantitative approach to effectively address the research questions and sub-research topics. This methodological choice is particularly suitable for systematically examining the relationships between various factors and their impact on the performance of Dutch high-tech startups. The study intends to create a strong basis for its investigative procedure and contribute to the development of knowledge by building upon previous research findings and utilizing known methodologies and frameworks.

[3]Startups established between 1st January 2017 and 31st December 2020 were considered

Data collection will involve gathering information from a carefully selected sample of high-tech firms operating in the Netherlands over a specified time frame, typically between 2017 and 2020. This selection process will ensure that the study captures a diverse representation of the high-tech startup landscape in the Netherlands. Furthermore, the survey questionnaire was meticulously designed to collect the data, building on existing literature and survey questions previously used by other authors in the same research area. The collected data will then undergo thorough statistical analysis to uncover any meaningful associations between the independent variables—such as Novelty-centered BM, Efficiency-centered BM, Cost-leadership strategy, and Differentiation strategy—and the dependent variables, including Growth in FTE (Full-Time Equivalent Employees) and Change in revenue. Advanced statistical techniques, such as regression analysis, will be employed to explore the strength and direction of these relationships. This comprehensive methodology will increase the credibility and generalizability of the study findings, allowing for important insights into the linkages between business models, competitive strategies, and startup performance in Dutch high-tech startups.

Furthermore, to enhance the validity and robustness of the findings, certain factors will be controlled during the analysis. Specifically, variables such as Firm age and Industry will be taken into consideration to account for potential confounding influences that could affect the observed relationships. Overall, this quantitative research methodology aims to provide a comprehensive understanding of the key determinants driving the performance of high-tech startups in the Netherlands. By systematically analyzing relevant data and employing statistical techniques, the study seeks to offer valuable insights that can inform strategic decision-making and contribute to the advancement of knowledge in the field of high-tech entrepreneurship.

1.7. Research Implications

1.7.1. Academic Implication

This study provides academic significance in the disciplines of strategic management and entrepreneurship. By rigorously investigating the influence of business model innovation and competitive strategies on the performance of Dutch high-tech startups, it contributes valuable insights to existing scholarly literature. The results of this study provide researchers and academics with a better grasp of the complex dynamics that influence startup success in the high-tech sector. Furthermore, the study lays the groundwork for future research, encouraging further investigation and the exploration of the hypotheses underlying business models, competitive strategies, and startup performance. This research also aims to potentially initiate interesting discussions and promote advancements in theoretical frameworks and practical applications within the academic community through this research study.

1.7.2. Practical Implication

By identifying the most successful business model design themes and competitive market strategies, the study offers valuable recommendations for startups seeking to enhance their performance and gain a competitive edge in the market. These practical insights can guide existing and upcoming startups in making informed decisions to optimize their operations and maximize their chances of success in the dynamic high-tech landscape. The research findings can assist entrepreneurs in refining their decisions regarding their business models and strategic approaches, allowing them to deliver consumer value better and grow their market

position. Furthermore, the study emphasizes the significance of constantly updating and altering business models and strategies to suit changing market demands, offering practical insights for businesses seeking long-term success and sustainability.

The race to be the market leader or gain maximum market share, by creating value for customers, has become the goal of organizations. The need to constantly serve customer value will force firms to persistently update and adopt new and upgraded business models and strategies. As a result, firms are now searching for better ways to combine business models and strategies so that the combined outcome will assist the firm in creating value and thereby increasing its market position. This study aims to broaden the scope of strategic management literature on business models and competitive strategies while providing high-tech startups with the most effective business model design theme and competitive market strategy during the growth stages.

1.8. Thesis Outline

The thesis provides a comprehensive literature review on business model innovation, competitive strategies, and their influence on firm performance. This study describes the business model as a way for the firm to create and capture value for both the customer and the organization [Zott and Amit, 2010; Teece, 2010; Osterwalder and Pigneur, 2010] and also as a strategic tool for firms to gain a competitive advantage [Heikkilä et al., 2018]. Thereby the term ”business model innovation” refers to the process by which a company modifies its business model, resulting in a fundamental shift (e.g., New revenue streams, Distribution channels, etc.) in the value the company creates and provides to all stakeholders [Northeastern University, 2017]. Consequently, in this study ”competitive strategy” is defined using the strategies suggested by [Porter, 1980].

The subsequent sections encompass the following topics, literature study, conceptual model, research methodology, analysis, discussion, and conclusion. The second chapter dives into the concepts of the variables at hand. The third chapter looks at the theoretical background and formulation of hypotheses with the conceptual model developed based on the literature. Next, the methodology chapter provides information on the research design and data collection for conducting the research. Subsequently, the analysis chapter through statistical analysis presents insights into the collected data. Toward the end of this thesis, follow the discussion and conclusion chapter, which discusses the findings and concludes by answering the research question and providing the scope for future research.

2

Literature Study

2.1. Business Model

The ”Business Model” concept in today’s world follows the definition offered by Osterwalder et al. [2005], describing the present rationale of how organizations generate, deliver, and capture value. Despite the term ”business model” being commonly utilized nowadays in business studies as well as by managers, it demonstrated a lack of clarity in its definition [Saebi and Foss, 2015]. Various scholars and researchers have developed theories and definitions around the term ”Business model” (as seen in figure 2.1). The ongoing technological advancement constantly challenges the existing business models (BM’s) used by firms and compels them to adapt to the market changes, transforming their business model to remain sustainable in the emerging economy [Guo et al., 2022]. Thus, the concept of a business model, commonly followed or accepted by most managers and scholars, is that a firm makes use of a business model to primarily provide a relevant value proposition to its customers and generate profits for its growth.

Ergo, in today’s competitive world of cut-throat competition, the customer is not at the end of the value chain but at its center stage. Some of the biggest companies that have emerged in the last half a decade (Uber, Airbnb, Xiaomi) have kept customers’ needs as the utmost priority. These companies have disrupted their respective industries through innovative use of technology in their products and services and by tuning their business model to meet customer requirements. Even though the companies are spread across different industries, their secret to success lies in their unique and innovative business model [Bashir and Verma, 2017]. In the high-tech industry, it is therefore important for companies to innovate in response to market demand [Mohr et al., 2011]. Companies continuously innovating with respect to market demand sets them apart from other businesses in the marketplace, as these companies focus on integrating this innovation into their competitive strategies. When it becomes a standard practice in the market- to develop, innovate, and introduce new products or services, to build a competitive advantage over its rivals- an entrepreneur must be aware of all the dynamics at play in the environment and the organizational context in which it operates [Vale et al., 2008]. Hence, the changing market requirements propel firms to also make changes to their operational procedures and strategic decisions [Mohr et al., 2011].

Author(s)	Definition
Chesbrough and Rosenbloom (2002)	The business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic inputs. The business model is thus conceived as a focusing device that mediates between technology development and economic value creation. (p. 532) It "spells out how a company makes money by specifying where it is positioned in the value chain" (p. 533)
Morris et al. (2005)	A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustain- able competitive advantage in defined markets. (p. 727)
Shafer et al. (2005)	We define a business model as a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network. (p. 202)
Chesbrough (2006)	At its heart, a business model performs two important functions: value creation and value capture. First, it defines a series of activities that will yield a new product or service in such a way that there is net value created throughout the various activities. Second, it captures value from a portion of those activities for the firm developing the model. (p. 108)
Johnson, Christensen, and Kagermann (2008)	A business model, from our point of view, consists of four interlocking elements that, taken together, create and deliver value. The most important to get right, by far, is the customer value proposition. The other elements are the profit formula, the key resources and the key processes. (p. 52-53)
Demil and Le- cocq (2010)	Generally speaking, the concept refers to the description of the articulation between differ- ent BM components or 'building blocks' to produce a proposition that can generate value for consumers and thus for the organization. (p. 227)
Osterwalder and Pigneur (2010)	A business model describes the rationale of how an organization creates, delivers, and cap- tures value. (p. 14)
Teece (2010)	In short, a business model defines how the enterprise creates and delivers value to custom- ers, and then converts payments received to profits. (p. 173)
Zott and Amit (2010)	A business model can be viewed as a template of how a firm conducts business, how it de- livers value to stakeholders (e.g., the focal firms, customers, partners, etc.), and how it links factor and product markets. The activity systems perspective addresses all these vital issues [...]. (p. 222)
George and Bock (2011)	[...] a business model is the design of organizational structures to enact a commercial oppor- tunity. (p.99) [...] three dimensions to the organizational structures noted in our definition: resource structure, transactive structure, and value structure. (p.99)

Figure 2.1: Various definitions for Business Model

When designing a business model, executives generally focus on the organization's operational aspect of the business, like compensation policies, vendor and purchasing contracts, marketing and sales initiatives, and so on, and these managerial decisions thereby create an impact on the firm's performance and market outlook. For instance, price is a decision that has an impact on sales volume, which has an impact on the company's scale economies and bargaining leverage. Therefore, organizations need to include and make appropriate decision choices for creating and capturing value when formulating their business model [Ricart and Casadesus-Masanell, 2011]. Ricart and Casadesus-Masanell [2011] highlights three characteristics of an effective business model. First, a BM is aligned with company goals, meaning the business model being designed should be in line with the company objectives (to capture and create value). Second, the BM should be self-reinforcing, meaning the choices made by

the executives when formulating the business model should have internal consistency, i.e., complement one another. Lastly, the business model should be designed to be robust (non-imitable and non-substitutable), allowing the firm to compete effectively and impactfully.

Firms using a structured framework can identify their value propositions, convey their ideas, and plan a path toward development and profitability with the help of business models. Additionally, business models help businesses make better decisions by helping them define their pricing strategies, market positioning, and operational procedures. An example of Stripe, a payment processing platform, demonstrates the importance of innovative business models within the high-tech industry. Stripe's commission-based business model has played a pivotal role in enabling businesses of all sizes to take payments online and on mobile devices. This business model for Stripe has helped their expansion and scaling up by streamlining and simplifying their payment processing economically and efficiently. Other than Stripe, there are numerous examples of businesses reaping the benefits of revolutionary business models. Airbnb, for example, has changed the hospitality business by allowing homeowners to rent out their houses to guests, thereby profiting customers, clients, and the business itself. Furthermore, firms such as DoorDash and Instacart have used models that allow them to provide meal delivery services without incurring the costs of owning restaurants or grocery stores. This example demonstrates how novel business models may promote growth, add value to customers, and provide a competitive advantage to the organization.

Firms must have a competitive business model; however, with no clear definition being there of a "Business Model" over the years, it was often confused with the related term in strategic management, "business strategy", both in literature and by businesses [Chesbrough and Rosenbloom, 2002; DaSilva and Trkman, 2014]. With the increasing research around both these topics, it was found that, though these terms are related in the overall organizational aspect, but they define different aspects of the organizational activity and thus should not be interchanged during their use. To explain the difference, business strategy takes into account the relationship between the company and its environment (environmental-centric) [Pynnönen et al., 2012], acknowledging the existing competition and dynamic market trends. While the business model is used as a tool to implement the business strategy [Pynnönen et al., 2012], for exploiting opportunities (opportunity-centric) [Amit and Zott, 2001; George and Bock, 2011; Behnke and Kibbel, 2017].

Thus, to harness the potential of business models for achieving competitive advantage, customer satisfaction, and elevated market position, Behnke and Kibbel [2017] highlights that researchers have examined the concept of business models through various theories. These include Michael E. Porter's value-chain and value system theories, which elucidate value creation through a business model, Jay Barney's resource-based view, which explains business models in the context of generating competitive advantage, and Oliver E. Williamson's transaction costs economics, which delves into a firm's boundaries [Schneider and Spieth, 2013; George and Bock, 2011; McGrath, 2010; Morris et al., 2005; Osterwalder et al., 2005; Barney, 1991; Amit and Zott, 2001]. As a result, depending on the researchers' point of view, the business model was identified and characterized as a structural template [Deshler and Smith, 2011; George and Bock, 2011; Teece, 2010; Amit and Zott, 2001], a system [Sorescu et al., 2011; Zott and Amit, 2010; Chesbrough, 2007; Morris et al., 2005], a description [Berglund and Sandström, 2013; Demil and Lecocq, 2010; Osterwalder and Pigneur, 2010], a framework [Doz and Kosonen, 2010; Chesbrough and Rosenbloom, 2002], or a conceptual tool [Osterwalder et al., 2005].

Despite the many views and concepts proposed for a business model, most scholars concur that the core concept or ground fundamentals of a business model is to create value (for all stakeholders) and deploy techniques (strategies) for value capture [Saebi et al., 2017]. Therefore, it is crucial in the case of high-tech startups to have a distinctive business model that differs from a conventional business model. The founding principle of high-tech startups is frequently based on a new idea or technological advancement, and developing a unique business model will propel their growth by increasing the company's competitive advantage. Thus, businesses must continue to prioritize the strategic adoption of distinct and creative business models to capitalize on their natural ability to disrupt markets and grab potential opportunities [Ireland et al., 2003; George and Bock, 2011]. Focusing and strategically planning the elements of a business model will help businesses formulate their business model better.

2.1.1. Business Model Elements

For value creation, delivery, and capture, businesses strategically plan out on a business model canvas (BMC). A BMC is a strategic tool used by businesses for developing new business models or documenting existing ones. A BMC is a simple, one-page canvas on which businesses and entrepreneurs design, innovate, and formulate the firm's business model. BMC is very helpful, particularly in the initial and exploratory stages of startup development, growth, and innovation. It is used as a framework developed to articulate the company's business models and to find the most appropriate balance between a firm's social and business objectives. Its developers define BMC, Osterwalder and Pigneur [2010], as "a tool for describing, analyzing, and designing business models" and a medium that ensures a "shared language" during business model development. A BMC allows for iterative improvements. as it is "simple and easy to use" and can be used as a means to improve "transparency, creativity, and innovation" [García-Gutiérrez and Martínez-Borreguero, 2016; Trimi and Berbegal-Mirabent, 2012]. It also supports interactions with stakeholders and their understanding of the business model. As a result, the BMC is a crucial tool for startups in business model innovation [Trimi and Berbegal-Mirabent, 2012].

Although the BMC encourages firms to identify strategies and steps to improve their business model, it should be kept concise with only the key elements of the BM, and not filled with detailed information on each element part when creating the business model. A BMC is a systematic technique that allows firms to explore possibilities and test new concepts. This fosters creativity and innovation, encouraging employees to think outside the box. Today, organizations follow a standard business model canvas comprising nine key elements [Osterwalder et al., 2005] that cover the three main areas of business: Desirability, Viability, and Feasibility. Desirability includes Value Proposition, Customer Segment, Customer Relationships, and Channels. Viability consists of the elements, Revenue streams, and Cost structure. Lastly, feasibility comprises the components, Key Resources, Key Activities, and Key partnerships. These elements together form the foundation of the business model. Firms make changes to these BM elements when adapting their existing business model to the changing market.

BMC is thus more than just a structural tool; it serves as a solid framework that allows for a thorough understanding of the complicated interactions between the value a business produces and the value it collects. In essence, the BMC is a dynamic framework that enables firms to review their current value proposition while also proactively positioning themselves to suit altering market demands. The BMC enables stakeholders to venture into unexplored territory within their business models, encouraging creativity and innovation. It pushes people

to think freely and unconventionally, fostering the discovery of creative techniques for creating, capturing, and delivering value. As a result, business model innovation has emerged as a critical source of competitive advantage and value enhancement. Businesses, managers, and entrepreneurs that fully realize the BMCs' potential not only get a deeper knowledge of their market positioning but also unleash the latent power of business model innovation to excel in an ever-changing business environment [Amit and Zott, 2012].

2.2. Business Model Innovation

Business model innovation (BMI) is the practice of gaining a competitive edge and creating value by simultaneously implementing changes to an organization's value proposition to consumers and its underlying operating model. Changes to the value proposition might address the target segment, product or service offering, and revenue model. However, the operational level focuses on creating profitability, competitive advantage, and value creation by delivering value propositions. Furthermore, BMI is not confined to startups or technology-driven businesses; incumbent corporations may profit considerably by reevaluating and renewing their business models. Thus, these established organizations may stay up-to-date and competitive by periodically reviewing their value proposition, goods and service offerings, and revenue generation strategies.

For instance, one would attribute the success of Apple, Microsoft, and Intel to their assets, such as iPods, Xbox's, and PCs, but these assets were obtained not by purchasing them but by making intelligent business model decisions about pricing, licensing, and product line, among other things [Ricart and Casadesus-Masanell, 2011]. Consequently, an innovative business model is needed for any company in today's competitive world to gain market share and an advantage. A business model defines how a company provides value to consumers, persuades consumers to pay for the value, and transforms those payments into profit. In an inventive world, as technologies keep advancing, businesses must invariably re-evaluate their business model and alter the value propositions to meet the customers' new requirements [Teece, 2010]. BMI, much like business models themselves, has been defined in various ways by different authors, as depicted in Figure 2.2. This diversity of definitions emphasizes the complexity and evolving nature of the concept of BMI, reflecting the diverse perspectives and approaches within the field of strategic management research.

"A mediocre technology pursued within a great business model may be more valuable than a great technology exploited via a mediocre business model" [Chesbrough, 2010].

The business model concept's practical appeal stems from its ability to illustrate, clarify, and simplify the core elements of how a firm develops and captures value [Neubauer, 2011]. BMI enables a company to capitalize on evolving customer requirements and expectations [Northeastern University, 2017]. Through BMI, companies change their business offerings (value proposition) and operating models to enhance their competitive advantage and value generation by meeting customer requirements. BMI addresses changes to the target segment, product or service offering, and revenue model and also focuses on increasing profitability to gain a competitive edge. Research done in recent years indicates that commercializing the value of innovation through technology alone cannot create a competitive advantage anymore [Behnke and Kibbel, 2017], but firms need a business model that ensures the fit mentioned to gain an edge over the competition [Teece, 2010; Morris et al., 2005; Chesbrough and Rosenbloom, 2002; Chesbrough, 2007].

Despite the advantages of BMI, firms still often opt to imitate a business model rather than create an innovative one themselves. Lanzolla and Markides [2021] explains why firms need to carefully plan their business strategy and develop a business model such that it is not easy to imitate. Imitating the business model becomes more accessible when the parent firm and its subsidiary firm market the same product or service and thus fight for the same market share. For example, Nestlé created a division within its coffee brand (Nescafé), Nespresso. Despite being a separate entity, Nespresso followed the same business model as Nescafé and targeted the same customer base [Lanzolla and Markides, 2021]. This replication exacerbated competition inside the company's own portfolio, leading to sales cannibalization and a loss of distinction. In addition, the strain of running parallel operations influenced Nespresso's key staff, financial resources, and overall profitability. This example demonstrates the possible hazards of imitating existing company strategies without fully addressing the long-term repercussions and the necessity for continuous innovation to maintain a competitive edge [Brem et al., 2016].

Author(s)	Definition
Demil and Lecocq (2010)	Business model evolution is "a fine tuning process involving voluntary and emergent changes in and between permanently linked core components"
Teece (2010)	Business model learning is "an established firm modifies its business model in face of competition from a new business model"
McGrath (2010)	Business model erosion is "the declining competitiveness of established business models"
Morris et al. (2005)	Business model lifecycle is "involving periods of specification, refinement, adaptation, revision and reformulation. An initial period during which the model is fairly informal or implicit is followed by a process of trial-and-error, and a number of core decisions are made that delimit the directions in which the firm can evolve"
Aspara et al. (2013)	Business model transformation is "a change in the perceived logic of how value is created by the corporation, when it comes to the value-creating links among the corporation's portfolio of businesses, from one point of time to another."
Markides (2006)	Business model innovation is "the discovery of a fundamentally different business model in an existing business"
Aspara et al. (2010)	Business model innovation is "initiatives to create novel value by challenging existing industry-specific business models, roles and relations in certain geographical market areas"
Khanagha et al. (2014)	Business model innovation is "can range from incremental changes in individual components of business models, extension of the existing business model, introduction of parallel business models, right through to disruption of the business model, which may potentially entail replacing the existing model with a fundamentally different one."

Figure 2.2: Various definitions for Business Model Innovation [Foss and Saebi, 2018]

Another example of Unilever explains the effect of the business model on an organization's brand image, market position, and portfolio. Lanzolla and Markides [2021] through this example explains that Unilever may risk hurting its existing brands and weaken its strong culture of innovation and uniqueness if it goes aggressively into the private label of a product category in a certain market segment. This indicates that imitation is not a challenge for firms. However, the conflicts arising from using the same or similar business model will make adopting the new business model difficult for the imitating firm [Lanzolla and Markides, 2021]. Hence, firms focus more on innovating the business model than imitating existing business models, as they realize that imitating the business model will not aid the firm's performance in the long run, leading to lower survival rates due to an increase in competitors [Behnke and Kibbel, 2017].

Lanzolla and Markides [2021] also provides a contrasting case of Canon's breakthrough into the photocopier business. Xerox, the leader in the copier market, had a first-mover advantage compared to other companies like Kodak, Canon, and IBM, who followed the same strategy as Xerox to seize market share. However, only Canon successfully increased its market position in the photocopier business. This increase was because its business model targeted small and medium-sized enterprises and presented the cost-quality value proposition, while other companies (such as IBM) targeted big-sized firms, imitating Xerox's business model. Canon placed the structure of its business model at the foundation of its strategy and formulated an innovative business model differentiating Canon from its competitors and helping its growth in capturing a new market segment [Shankar et al., 1998; Porter, 2011; Lanzolla and Markides, 2021]. Thus, BMI is crucial for companies, yet challenging to implement [Chesbrough, 2010]. Imitating a business model (even an innovative business model) will eventually lower the firm's performance, as firms need to stay competitive to survive in this dynamic market environment. BMI, if implemented correctly, can aid firms in achieving a higher performance, as it would help firms adapt their existing business model with respect to ongoing trends and competition.

Summarizing, the research into BMI shows its crucial role in determining organizational resilience and performance in a quickly changing business environment. By utilizing creative business models, businesses may create value, obtain a competitive edge, and adjust to changing consumer requirements. As a result, knowing the many frameworks and tactics available for BMI is crucial. Therefore, in a constantly changing market, business model design serves as a foundation that businesses may use to create and execute innovative business models that maximize performance and guarantee long-term relevance.

2.3. Business Model Design

Innovating and designing the business model that ensures the right fit has become difficult for management executives and especially challenging for startup founders, as the founders lack skill in designing a business model, even though they are often considered "specialists in the technical area of the innovation" [García-Gutiérrez and Martínez-Borreguero, 2016]. There are several frameworks suggested by authors [Behnke and Kibbel, 2017] for creating business models, with Osterwalder and Pigneur's Business Model Canvas being the most well-known [Spieth et al., 2014]. In this regard, Demil and Lecocq [2010] distinguishes between a static and dynamic approach on business model design. The dynamic approach views the business model as a tool for addressing change and innovation, whereas the static perspective views it as a blueprint for coherence among fundamental elements of the business model [Behnke and Kibbel, 2017]. In the static view, the scholars differentiate between the elements of the business model, while in the dynamic view, the scholars understand the behavior in which the business model develops over time [Demil and Lecocq, 2010]. Thus making both the elements of the business model and the business model itself essential for fostering innovation and enhancing firm performance [Trimi and Berbegal-Mirabent, 2012].

It is impossible to overestimate the importance of BMI in reacting to technology improvements and changing client needs. Companies must constantly examine and adjust their business models to stay competitive as they traverse the intricacies of today's business market. This necessitates a thorough grasp of both the static components that create coherence within a business model and the dynamic nature of its change over time. Companies should develop a business model that improves performance and aids in gaining a competitive edge by com-

bining the insights from the static and dynamic approaches.

The design of a business model acts as a blueprint for how a firm develops and collects value, and it indicates how a business communicates with its consumers, generates revenue, manages resources, and forms relationships. Various themes determine how an organization approaches value generation in BM designs. These topics give a systematic framework for establishing a company model that is in line with specific goals and market demands. Zott and Amit [2007] followed the configuration theory, implying that, when developing measures of a business model design, "the degree to which an organization's elements are orchestrated and connected by a single theme" [Miller, 1996]. Using this configuration theory and treating the configuration view as a variable rather than a deviation from the standard design, Amit and Zott [2001] provided four BM design themes that can help enhance firm performance and gain a competitive advantage. These design themes are - Novelty, Efficiency, Complementarities, and Lock-in. This is termed the "NICE" model of BMI, which includes novelty, efficiency, lock-in, and complementarity [Zhang et al., 2023]. These BM design themes are critical components of the BMI process, reflecting fundamental features that form a firm's strategic direction and value-generating processes. When contemplating BMI, firms frequently try novel combinations of these design elements to respond to fluctuating market dynamics, technology breakthroughs, and shifting client preferences. Companies may effectively reinvent their business models by iteratively refining and recombining existing design themes or incorporating innovative elements. Thus, the interplay between BM design and BMI highlights the importance of different configurations and adaptations of these themes, to promote sustainable growth, drive value creation, and strengthen organizational resilience in an environment that is becoming more complex and unpredictable.

Amit and Zott [2001] established the concept of the business model and its four value-creation themes, which led to numerous studies aimed at objectively verifying the effects of these themes on firm performance. The novelty theme [Brettel et al., 2012; Hu and Chen, 2016; Zott and Amit, 2007] and the efficiency theme [Brettel et al., 2012; Zott and Amit, 2007] have both been independently validated. Consequently, efficiency-centered and novelty-centered BM designs are suitable for studying the business models employed by entrepreneurs, as these design themes provide crucial opportunities for value creation amid uncertainty [Zott and Amit, 2007; Quirino and Dias, 2021]. As these BM design concepts are not necessarily mutually exclusive, any particular BM design can be both novelty-centered and efficiency-centered [Zott and Amit, 2007]. However, in contrast, only isolated case studies have been used to support the stand-alone impacts of complementarity or lock-in [Parker et al., 2016], and these themes are not in line with the startup's characteristics and are mostly used by established firms.

This study looks at the most prominent themes of a business model studied by researchers, efficiency, and novelty, and does not look into lock-in and complementary business model design themes due to their lack of significance in the context of startups. Moreover, Lock-in design often includes methods that make switching to other products or services difficult for customers. Making it more relevant for established firms in mature sectors. Complementary design refers to the process of building a synergy between diverse goods or services within an ecosystem, which may or may not be the major and initial focus of startups. Given the study's major focus on startups, it is only rational to focus on the design themes that are most relevant to these early-stage companies, thus, efficiency and novelty-centered BM designs are selected.

2.3.1. Business Model Novelty

Startups are typically distinguished by their intrinsic desire to create disruptive goods and services, frequently utilizing cutting-edge technology to disrupt existing markets, making Business Model Novelty a predominant theme choice. The goal of a novelty-centered BM design is to stimulate the development and use of novel techniques for conducting business transactions. The fundamental concept of novelty-centered BM design is the creation and adoption of new ways of conducting business transactions, which can be accomplished through linking disassociated users, linking transaction participants in novel ways, or designing novel transaction mechanisms [Zott and Amit, 2007].

The divergence from the typical product-centric approach is an essential characteristic of BM novelty. Instead of just providing items or services, it strives to create a one-of-a-kind value proposition suited to one or more consumer categories. This value proposition must have a particular trait of providing higher value to customers while being financially, socially, and environmentally sustainable. Startups use BM novelty to convert traditional transaction patterns into fresh and inventive configurations, eventually moving into an untapped market. The use of BM novelty provides several advantages to entrepreneurs, as it enables organizations to capture the desired first-mover advantage [Rai and Tang, 2014; Amit and Zott, 2001; Tambe et al., 2012], allowing them to investigate emerging prospects, get an early foundation, and derive significant benefit from their initial efforts. Furthermore, BM novelty adds to the reduction of partner switching costs, which strengthens the startup's position by making competitors less appealing. BM novelty also provides a platform for developing distinct competitive advantages. Startups may capitalize on their distinct innovative capabilities and essential assets, which are often difficult to copy or acquire through conventional means [Zott and Amit, 2007; Brettel et al., 2012].

Furthermore, BM novelty acts as a catalyst for innovation, not just inside the constraints of the business model but also across all aspects of a startup's operations. It enhances innovation by spreading its impact across sectors such as product creation, service delivery, manufacturing processes, distribution, and marketing tactics. With the entire organization being aligned with a holistic approach to innovation, startups implementing BM novelty become adaptable and proficient at managing the ever-changing business environment while actively capturing new opportunities as they grow. For instance, Twilio, a high-tech startup, showed how BM novelty substantially influences firm performance. Twilio challenged the usual monthly charge and long-term contract approach of communication providers by providing a pay-as-you-go model for cloud communications. This novel business model enabled developers to effortlessly incorporate audio, video, and messaging features into their products while drastically lowering expenses, benefiting small enterprises and startups. Twilio's developer-friendly approach, extensive documentation, and broad customer support choices increased customer satisfaction. Furthermore, the great scalability of Twilio's business model permitted quick development into new areas, attracting noteworthy investors and partners globally, in turn aiding their multi-fold growth.

Thus, implementing the novelty-centered business model provides organizations with a lens through which to navigate the evolving landscape of innovation. By prioritizing novelty in their approach to BM design, companies can uncover unique insights and opportunities that enable them to stay ahead of market trends and competitor actions. This emphasis on novelty develops a culture of experimentation and innovation inside firms, resulting in constant development and adaptability to changing market circumstances. While BM innovation is usually

regarded as a driver for increased company performance, the link between the two is not always clear. As the varied empirical data show, the influence of novelty on performance differs across contexts and sectors [Hu and Chen, 2016]. This emphasizes the need to take into account a variety of elements, including market circumstances, organizational capabilities, and strategic objectives while evaluating the efficacy of unique business models.

2.3.2. Business Model Efficiency

Zott and Amit [2007] proposed two opposing business model design themes: efficiency-centered and novelty-centered business models, for entrepreneurial firms. [Gerdoçi et al., 2018] refers to the strategic decisions firms make to improve transaction efficiency through their business model. This method seeks to lower transaction costs for all stakeholders participating in the business process. For entrepreneurs, the pursuit of efficiency through business model design is motivated by the broader objective of streamlining operations and increasing the total value offered. Entrepreneurs beginning on efficiency-focused BM efforts sometimes find themselves at a crossroads, having to choose between designing wholly new and improved business models or copying old ones [Zott and Amit, 2007]. The decision to mimic established models is linked to the possibility of decreasing transaction costs, which is an essential indicator of enhanced efficiency and crucial for companies [Zott, 2003]. In either case, the goal remains the same: create value by increasing customers' willingness to pay for a product or service or by lowering the opportunity costs borne by suppliers and all partners. This decrease in potential costs is accomplished through increased transaction efficiency; transaction efficiency avoids the waste of time, effort, and money in the completion of a business transaction.

Efficiency-centered BM tends to be defensive, with the double goal of minimizing risks stemming from data disparity while also assuring the efficacy of company operations for all parties engaged in a transaction [Zhang et al., 2023]. This technique promotes optimal performance results by reducing uncertainty and operational bottlenecks. Efficiency-driven companies prioritize cost reduction and process optimization, frequently incorporating standardization into their business operations. Further, Zhang et al. [2023] in their research provides the example of Airbnb, a significant player in the accommodation industry, showing the impact of BM efficiency on high-tech startup performance. Airbnb's business model is incredibly efficient, with low overhead expenses and significant scalability. Because the corporation does not own any properties and only advertises them, it is not required to invest in capital-intensive assets. Airbnb also employs technology to automate many procedures, lowering costs and increasing efficiency. with this effective business strategy, Airbnb has experienced enormous growth and has become one of the world's most successful firms. Similarly, startups that would embrace an efficiency-centered business model, in essence, will align themselves with a low-cost direction. This strategic approach is focused on methodically decreasing operating expenditures and optimizing procedures, making it an appealing option for businesses wishing to create efficient and cost-effective business models. As a core element of BM design, efficiency improves startup performance and positions them advantageously in competitive marketplaces where cost-effectiveness and streamlined operations are critical success determinants.

While BM efficiency is frequently associated with increased profitability and operational effectiveness, it is important to note that its influence varies depending on the particular setting and industry characteristics; for example, Balboni et al. [2019] did not find a significant relationship between BM efficiency and firm performance. Despite no significant results, researchers still suggest a positive influence of BM efficiency on firm performance, as companies that pri-

oritize efficiency in BM design, could position themselves toward sustained profitability and resilience, which are essential in today's volatile business environment. Thus, to summarize, while business model designs are significant in influencing a startup's development, it is critical to note that they generally do not exist in isolation. The impact of these designs on business success is intrinsically linked to the competitive strategies businesses use. Both efficiency-centered and novelty-centered business model designs provide distinct benefits, whether via cost reduction and process optimization or by using creative ways to attract customers. However, the impact on company performance is typically determined by how effectively these designs align with and support the startup's competitive objectives. Thus, evaluating and improving the performance of high-tech startups in today's changing business landscape requires a comprehensive view that integrates business model innovation and competitive strategies.

2.4. Competitive Strategies

Acknowledging a company's capacity to outperform its competitors within a specific business model offers the potential for heightened shareholder returns, assuming all other variables remain constant. Understanding the intertwined effects of business models and business strategies is crucial, as they can significantly impact a firm's performance outcomes. As highlighted by Siggelkow and Levinthal [2003], firms aiming for a competitive advantage must discern operational combinations that are not only internally cohesive but also tailored to their current business environment. Strategy, much like a business model, encompasses multiple dimensions that influence a firm's competitive advantage. Hedman and Kalling [2003] emphasize the importance of incorporating industry selection, market positioning, client segmentation, region selection, product diversity, frameworks, mindsets, value networks, and resources into strategic decision-making. Additionally, according to Von Gelderen et al. [2000], entrepreneurs achieve their goals by developing a strategy closely linked with the implementation process rather than solely focusing on execution [Lumpkin and Dess, 1996].

Startups generally face the choice of competing based on price or differentiation through offering a superior value product [Block et al., 2015]. The selection of an appropriate strategy is crucial for startups to establish their presence in the market. The choice of competitive strategy (CS) for the startup depends on the entrepreneur's decision based on the market trends, set of resources, competitors, and customer requirements at that point in time, as the requirements are dynamic. These strategies enable startups to establish a competitive position in the market and also penetrate a mature market by connecting existing and new customers to improved (quality or price or both) products and services than the existing ones. Carter et al. [1994] and Block et al. [2015] shed light on the strategic preferences of high-tech startups during their initial stages of adoption, emphasizing the prevalent inclination towards either cost leadership or differentiation strategies. This strategic decision is motivated by the need to establish a distinct market position and acquire traction against fierce competition. These strategic choices represent the practical approaches used by high-tech startups to overcome the challenges faced during early-stage business development.

To classify and discuss firm strategies, Michael Porter's strategic typology has been widely used since the early 1980s [Akan et al., 2006; Block et al., 2015]. Porter's typology presents three strategic positioning choices: Cost Leadership, Differentiation, and Focus. These strategies offer distinct approaches for firms to gain a competitive advantage. This research focuses on Porter's competitive strategies as they are closely linked to firm performance and complement other strategic typologies [Block et al., 2015]. The overlap between Miles and Snow's

typology and Porter's generic strategies is notably highlighted by Block et al. [2015], revealing that differentiation and cost leadership strategies are in line with the four strategic typologies of Miles and Snow: defenders, prospectors, analyzers, and reactors. Porter (1980) suggested the focus strategy as a third strategy for companies to improve their performance alongside differentiation and cost-leadership strategies. Focusing on a certain local market, product line, or customers is the purpose when implementing this strategy [Islami et al., 2020]. By narrowing their focus, businesses modify their services and operations to address the demands of a certain niche market specifically. Pulaj [2014] asserts that the focus strategy improves business performance by allowing for adaptability to changing consumer preferences and market conditions. Continuing, the author argues that the focus strategy is built on knowledge and expertise in domains relevant to low cost or differentiation. Research indicates that these three strategic typologies described by Porter [1980] help businesses outperform competitors and provide them with a competitive edge. Acknowledging the significance of these strategies, this research focuses only on examining the cost-leadership and differentiation strategies that are prominent among startups. This deliberate choice is based on the fact that the focus strategy is often used in conjunction with either the differentiation strategy or cost leadership strategy [Thompson et al., 2013; David, 2011; Wheelen and Hunger, 2012].

These typologies provide organizations with frameworks and direction to help them match strategies to their objectives and the state of the market. Organizations can pose a high barrier to entry, through proprietary technology, brand recognition, or regulatory restrictions, making it substantially difficult for other firms to outperform. Thus, demonstrating a strong correlation between competitive advantage and performance, as these barriers safeguard their established assets from potential competitors. This notion is supported by the real-world example of Walmart's competitive edge in retail, which is fueled by cost-efficiency and a streamlined supply chain. Walmart's success is based on the mission of allowing people to live better lives through cost savings. This guiding principle pushed the company's emphasis on a strong supply chain management system. In the 1980s, Walmart consolidated its position by directly procuring items and collaborating with manufacturers to ensure consistently low pricing under the slogan "everyday low prices." This technique not only distinguished Walmart from competitors but also enhanced consumer loyalty, reduced spending, and significantly raised revenues. Walmart's strategic emphasis on direct sourcing, efficient supply chain management, development of private label brands, reduction of operating expenses, and leveraging bargaining power continues to underpin its success and exert significant influence on other retailers' and companies' pricing strategies [Node, 2023; Rickerby, 2023]. Hence, the appropriate selection and skillful implementation of CS stands to act as critical drivers impacting a company's performance and sustainability in this ever-changing business landscape.

2.4.1. Cost-Leadership Strategy

The "low-cost" strategy, also known as the cost-leadership strategy, is centered on producing standard supplies at remarkably low unit costs for price-sensitive customers [David, 2011]. While implementing this strategy, the focus remains on maintaining comparable quality at prices lower than competitors, ensuring that the firm's offerings do not compromise on quality but rather provide value by offering similar quality at reduced pricing [Islami et al., 2020]. There are two key approaches to executing the cost-leadership strategy; the first entails supplying products and services at the market's lowest possible prices, while the second focuses on providing standard goods and services at competitive prices by manufacturing, procuring, or distributing them at lower costs than competitors. Essentially, the primary goal remains

to deliver products and services at a lower price [David, 2011; Wheelen and Hunger, 2012; Thompson et al., 2013]. Several studies have discovered a substantial relationship between cost leadership strategy and organizational success. According to the literature study, the cost leadership strategy aims to produce a higher return on investment than competitors, leverage economies of scale, and experience the curve effect. To achieve cost leadership, firms focus on cost reduction in all facets of their operations [Kaliappen and Abdullah, 2013].

OnePlus, a smartphone manufacturer, quickly carved out a place in the competitive smartphone industry by implementing a low-cost strategy. OnePlus entered the market by selling premium-quality smartphones at significantly reduced rates, strategically positioning itself between budget-friendly companies like Xiaomi and established giants like Apple and Samsung. This strategy allowed OnePlus to match high-end features while significantly undercutting competitors on cost. Operating with the strategy of low margins and exclusive invite-only sales, OnePlus aimed at providing maximum value at low prices to its customers and eventually capturing the market. OnePlus successfully handled demand, avoided unsold inventory concerns, and simplified costs by rejecting traditional marketing approaches, reducing product variety, and selling entirely online. This innovative pricing approach resulted in quick market penetration, increased revenue, and a loyal customer base. Although this strategy aided the firm's initial growth, the founders found it difficult to maintain this low cost while also striving for profitability as the firm grew in scale [ICMR, 2014].

Thus, to sustain profitability using this strategy, firms must consistently outperform competitors in operational efficiency to maintain a competitive edge, as this strategy does not guarantee a long-lasting competitive advantage [David, 2011]. Barney [2002] supports this idea by suggesting that the competitive advantage of being a cost leader could diminish when multiple businesses adopt identical cost-leadership strategies and successfully imitate each other, offering similar products or services. Thus, to sustain a competitive advantage in the business, significant initial expenditures on cutting-edge equipment and processes are required. Barney [2002] also emphasizes that implementing cost-effective strategies through improvements or technology available in the open market alone will not provide a competitive advantage. As a result, preserving a long-term competitive advantage frequently would necessitate distinctiveness or constant innovation procedures in addition to the cost-cutting approach.

2.4.2. Differentiation Strategy

The differentiation strategy involves organizations aiming to set themselves apart from competitors by creating unique products/services or elevating the quality of their offerings to meet customer demand [Islami et al., 2020]. It's a strategy where a business endeavors to distinguish itself through product or service enhancements. As per Porter [1985], this strategy fosters customer loyalty as consumers perceive uniqueness, allowing companies to charge premium prices due to strongly attached differential features. The author further links firm performance with the benefits of pursuing a differentiation strategy, noting increased profits due to customer confidence, product quality, and brand perception [David, 2011]. Consequently, this strategy reduces price sensitivity, weakens supplier power, builds a strong entry barrier, and lowers the risk of competing goods. Differentiation strategies encompass brand positioning, creative marketing approaches, distribution channel control, advertising campaigns, technology advancements, high-quality products, and services, and enhancing the company's reputation [Zehir et al., 2015]. As a result, benefits from differentiation strategies are more likely to last, since rivals find it difficult to replicate distinctive goods and services [Grant, 1991].

A prime example when considering a firm's growth when implementing the differentiation strategy is of Sony, with the development and release of the groundbreaking Walkman portable music player in 1979. The strategy was to defy industry conventions and create a unique product by replacing standard features like the built-in speaker and recording capability. With a bold vision and strategic foresight, Sony successfully capitalized on a growing cultural trend by focusing on younger audiences and presenting the Walkman as a symbol of individuality and freedom. The Walkman demonstrated Sony's differentiation strategy's enormous growth potential by creating an unmatched brand identity, revolutionizing people's lifestyles, and shaping the company's success. The Walkman's success not only cemented Sony's status as a consumer electronics leader but also reshaped the whole music business. Its unique design and savvy marketing tactics established a new standard for portable entertainment devices, paving the way for future advances in the digital music space. [JAPAN Online, 2020].

However, for a differentiation strategy to be truly effective, the unique characteristics must be challenging and costly for competitors to replicate, as noted by [David, 2011]. This sentiment is further underscored by Valipour et al. [2012], who highlights that companies prioritizing product differentiation face heightened risks due to their reliance on innovation, often necessitating riskier ventures and substantial investments in product development, which can lead to increased debt utilization. Additionally, in alignment with Miller's contention [Miller, 1987], the pursuit of a differentiation strategy encourages businesses to make significant investments in research and development (R&D) to bolster their innovation capabilities, as emphasized by [Jermias, 2008]. Consequently, while creativity and innovation are essential for long-term success, the burden of debt and compliance with debt covenants can impede managers' ability to foster a culture of innovation within their organizations [Valipour et al., 2012].

Although both these strategies, with their respective techniques, enhance firm performance, they cannot be implemented together. According to Barney and Hesterly [2010], the organizational requirements of both techniques are fundamentally conflicting. Low-cost strategies necessitate simple reporting connections, whereas product differentiation necessitates cross-divisional/cross-functional collaboration. Firms that do not choose this strategy (middle pricing, medium market share) or seek to implement both strategies would fail, according to them. These companies are described as being "stuck in the middle." However, in this ever-changing marketplace, strategy serves as a compass, directing firms toward their aims and aspirations. It encompasses a spectrum of decisions and endeavors aimed at securing a competitive edge, accelerating growth, and guaranteeing long-term viability. Yet, the actual potential of strategy is realized when combined with the effective integration of business model innovation. The mix of CS and BMI allows firms to not only differentiate themselves from rivals but also create value for stakeholders in unique ways. Companies that integrate strategic efforts with creative business model designs can generate new possibilities, maximize resource use, and develop a culture of continual adaptation and renewal. In essence, the strategic integration of BM innovation facilitates firms to succeed over the long haul.

3

Conceptual Model

3.1. Relationship between Business Model Innovation and Competitive Strategy

When an innovative business model emerges, many established organizations respond by incorporating it into their current ones [Kim and Min, 2015]. However, not all firms increase their performance upon introducing the new business model due to a lack of proper execution of the business plan (business strategy). Clauss et al. [2019], also through their findings demonstrated that Business Model Innovation (BMI) plays a crucial role in the relationship between strategy and firm performance. Bashir and Verma [2017], further highlighted that in the past five years firms who have outperformed their competitors and grew their operating margins at a far faster rate have focused twice as much on their business models as compared to their underperforming competition. According to this study, 40% of the CEO's questioned suggest that firms constantly invest significant time, energy, and resources to be the industry's first drivers of change, by implementing a distinctive business model (BM's) and strategy (CS's), and becoming a competitive threat, rather than being the last to change [Bashir and Verma, 2017].

Although the business model and business strategies are different concepts, they act jointly to improve the firm's performance and profitability. As the business model and business strategy are coherent, a third party can determine the firm's strategy by analyzing its business model [Casadesus-Masanell and Ricart, 2010]. A firm's plan of action requires a change to the existing business model(changes in policies, assets, and/or governance) when a potential competitor enters the market. Thereby indicating that strategies compared to business models are more contingent on the competition's performance which leads to firms adapting to an appropriate business model and strategy to counter the situation [Casadesus-Masanell and Ricart, 2010].

A case study of two businesses, S Group, and Kesko, in the Finnish retail industry demonstrates competing business models and their effect on their businesses over time [Ricart and Casadesus-Masanell, 2011]. To capture the market, S Group, a consumer-owned corporation, frequently provided lower prices to its customers and created a great value proposition. Kesko, started by entrepreneurs, had a franchisee-based business model and did not have competing prices as the firm could not compromise on value capture (profitability). Over time, as macroeconomic changes (like inflation) affected the market, S Group could not keep up with

the lower prices and forced its customers to pay a higher price, leading to customers switching to Kesko. Kesko, unlike S Group, considered the economic market trends while framing its business model. Based on their business model, this strategic decision led to increased profit margins by pricing close to S Group's pricing strategy and increased market share by capturing new customers [Ricart and Casadesus-Masanell, 2011], demonstrating the significance of business models and strategies and their impact on the firm's performance.

Building upon the extensive body of literature that examines the relationship between competitive strategies, particularly Porter's strategies, and firm performance [Bashir and Verma, 2017; Block et al., 2015; Islami et al., 2020], as well as research exploring the impact of business models, specifically Novelty and Efficiency, on firm performance [Zott and Amit, 2008; Amit and Zott, 2012; Balboni et al., 2019; Gronum et al., 2016], this study focuses on examining only the cost-leadership and differentiation strategy. The "Focus" strategy, is not examined in this study, as it is typically used in conjunction with either cost-leadership or differentiation strategy [Akintokunbo, 2018]. Thus the research examines if the cost-leadership strategy or the differentiation strategy influences the startup performance.

3.1.1. Case Study: Ryanair's Business Model Innovation

A prevalent example or case study when understanding the cumulative effects of business model and strategy on the firms' performance is of *'Ryanair'*. In 1990, Ryanair was on the verge of bankruptcy before it decided to change its business model entirely. Figure 3.1 displays the innovative business model developed by Ryanair to recover from Bankruptcy. Ryanair utilized its existing technologies to increase sales and enter new markets (hotel and car rental bookings). With the new business model of under-cutting the other airlines over cost, Ryanair provided its customer's flights at the lowest fare possible [DaSilva and Trkman, 2014]. This strategy to lure more customers worked for Ryanair because they strengthened their business model by establishing solid relationships with airports [Barrett, 2004], aircraft suppliers [Ruddock, 2008], employees, and attorneys (for any litigation with their strategic aims).

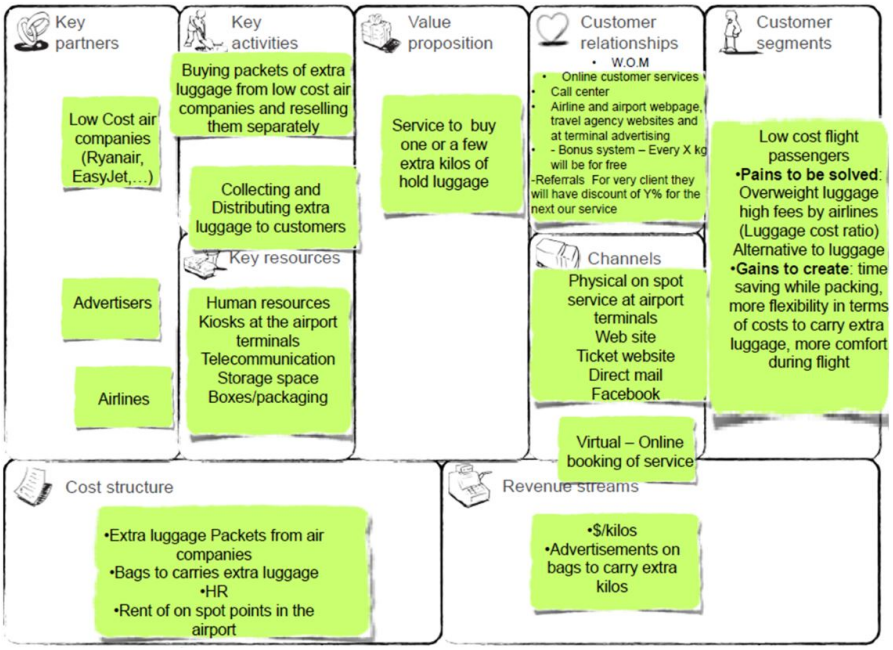

Figure 3.1: Ryanair Business Model Canvas

In this case, with their business model, Ryanair used the three strategy choices: Policy, Asset, and Governance [Casadesus-Masanell and Ricart, 2010]. Policy choices are the actions a company takes to operate its business, asset choices are the selection of tangible resources, and governance choices are the form of contractual agreements for decision-making [DaSilva and Trkman, 2014]. By adding dynamic capabilities to the business model and strategy, Ryanair produced value for both the company (low variable costs) and the customer (cheaper flights) [DaSilva and Trkman, 2014]. Figures in the appendix A.2, depict the choices taken, and the consequences of the choices made by Ryanair when implementing an innovative business model, and also illustrate the drastic changes Ryanair made to its business model. The figures depict that Ryanair implemented BMI by incorporating a novel BM with a low-cost strategy, averting the risk of bankruptcy.

3.2. Effect on Firm Performance

Entrepreneurs who establish startups must constantly seek opportunities and mobilize resources [Aldrich and Auster, 1986], in order to survive. Witt [2004], suggested three possible streams of measurements to evaluate the success of a startup. The first is based on the entrepreneurs' self-evaluation of the firm performance. This measure, however, is not suitable to measure the success of a startup, as not all entrepreneurs are equally satisfied [Chandler and Hanks, 1993]. The second measurement takes into account the survival year of startups. The issue in considering firm survival is determining a minimum period for survival. A short survival time may only include a portion of the early entrepreneurial phase, whilst a long survival period may comprise mature, developed firms rather than start-ups [Song and Vinig, 2012]. Previous studies have demonstrated that the third measurement has been the most successful measurement for companies [Witt, 2004; Brüderl and Preisendörfer, 1998], in measuring the growth performance of a firm. The most common metrics for this measurement are employment [Baum et al., 2000; Balboni et al., 2019; Block et al., 2015; Verbeeten and Boons, 2009] and revenue (sales) [Brüderl and Preisendörfer, 1998; Song and Vinig, 2012; Verbeeten and Boons, 2009] growth [Song and Vinig, 2012].

To measure firm growth, scholars have mostly used existing or created new theoretical frameworks based on the theoretical framework suggested by Zott and Amit [2008], when studying firm performance among, both startups and established corporations [Gerdoçi et al., 2018]. Scholars found varying outcomes, when measuring the influence of the independent variables (BM and CS) on firm performance, namely: Zott and Amit [2008]; Balboni et al. [2019]; Patzelt et al. [2008]; Brettel et al. [2012]; Hu and Chen [2016]; Pucci et al. [2017]. Even though not all of these authors have measured the impact of BM, CS, and their combinations on the firm performance measured by Growth in FTE (Full Time Equivalent Employees) and Change in Revenue, their research provides valuable insights to create a similar theoretical framework for this research study.

Multiple studies in management and strategic literature, have been done to study the framework with respect to firm performance [Zott et al., 2011]. Zott and Amit [2008] investigated the function of business models as mediators in the link between product market strategies and company performance through their empirical research and focused on market capitalization as an indicator of firm success. Their study findings show that combining a product market strategy with a complementing business model can lead to greater firm performance. Next, Balboni et al. [2019] narrowing their emphasis to Italian startups, investigated the impact of business model novelty on FTE growth. Their study discovered a positive association between

BM novelty and FTE growth, highlighting that innovative business models for Italian startups are related to higher employment. Researching the influence of Porter's strategies on firm performance, Slavik et al. [2020] identified a link between implementing a cost-leadership strategy and startup performance. With this relation, the authors concluded that firms that have prioritized the low-cost strategy perform better overall, especially in competitive market conditions. Similarly, Islami et al. [2020] through their research found a positive relationship between cost-leadership and differentiation strategies and firm performance. According to their findings, businesses that use these strategies perform better than their competitors.

Jun-ya and Xing-hua [2015] study, focusing on the effects of business model changes on firm performance, proved to be a vital addition. Using data from 151 emerging technology firms, the study empirically examined six hypotheses and discovered evidence supporting the favorable impact of both efficiency-centered and novelty-centered business model changes on firm success. These findings highlight the importance of new business models in boosting a firm's growth. Consequently, Gošnik et al. [2023] measured the firm's financial performance (Return on Equity, Return on Asset, Credit Rating, etc.) with the business strategies, cost-leadership, and differentiation strategies and found a higher and positive relation between the differentiation strategy and firm performance, than the cost-leadership strategy. Hence, their research concluded that businesses that implement a differentiation strategy outperform those that choose a low-cost strategy. Agoraki et al. [2011] added to this topic by investigating the influence of BMI on cost and profit efficiency, further contributing to the literature on strategic management. Their study found a link between business innovation, cost, and profit efficiency, emphasizing the necessity of innovative business models. Their research also looked at the elements that influence BMI, emphasizing the importance of employees and organizational characteristics and, through dynamic frameworks, revealed that firm size and human capital substantially impacted the adoption of innovative business models. In conclusion, guided by theoretical frameworks, these studies highlight the need to integrate business models and strategies to improve company performance by providing unique insights into the dynamics of various BM's and strategies and their influence on firm growth and overall performance. Considering these interplays between business models and competitive strategies in growing firm performance, this research sets the path for the formulation of numerous hypotheses. These hypotheses aim to dive deeper into the relationships between the variables and offer empirical support on the topics of business models and competitive strategies in the strategic management literature.

3.2.1. Hypothesis Formulation

Hypotheses are developed by integrating existing literature and empirical information to explain the expected results of specific strategic decisions and business models, providing a framework for rigorous analysis and interpretation of study findings. In this section, hypotheses are developed to investigate the possible influence of competitive strategies, business models, and their combinations, on the firm performance, by drawing on previous research and theoretical frameworks to construct testable propositions.

Consequently, a business model design that revolutionizes not only an organization's products and services but also its manufacturing, distribution processes, and transaction management is termed a novelty-centered business model. BM Novelty design, in particular, focuses on creating new markets or introducing innovative transaction methods within existing markets. In this context, the entrepreneurial designer plays a pivotal role in co-creating opportu-

nities by leveraging emerging information and communication technologies to forge new connections between factor and product markets [Zott and Amit, 2007]. Unlike Business Model Efficiency design, BM Novelty design has garnered broader consensus among multiple researchers (such as, Balboni et al. [2019]; Jun-ya and Xing-hua [2015]; Zott and Amit [2008]) for its positive impact on firm performance. For example, Adyen, a payment processing firm, has grown significantly by entering new areas and recruiting new clients by providing a variety of novel payment solutions. Adyen, for example, was one of the first payment processors to accept mobile payments, and it has now become a leader in the development of new payment technologies, in the Netherlands. Therefore, this research too anticipates a positive correlation between BM Novelty design and enhanced firm performance.

H1a: Increase in novelty-centered business model design is positively associated with the growth in the number of FTE.

H1b: Increase in novelty-centered business model design is positively associated with the startup's change in revenue.

Consequently, the BM Efficiency design does not solely focus on achieving traditional "efficiency," such as reducing production costs. Instead, its primary aim is to minimize transaction costs, encompassing various aspects such as the exchange of information, products, or services, direct or indirect transactions, and demand aggregation, among others. By optimizing these transactional processes, the BM Efficiency design seeks to enhance overall firm performance and effectiveness, as elucidated by [Zott and Amit, 2007]. BM Efficiency design increases the firm's bargaining power, as reducing the transaction costs increases the pool of potential customers, suppliers, and partners. Although only a few researchers (such as, Hu and Chen [2016]; Jun-ya and Xing-hua [2015]) found a positive effect of BM Efficiency on firm performance, this research still expects a positive effect of BM Efficiency designs on the firm performance, as high-tech startups, leverage technology to lower transaction costs, enhancing transaction efficiency. A case in point is Amazon's implementation of an order-tracking function into its business model, an intentional design element aimed at increasing transactional efficiency and transparency. This order-tracking functionality not only lowered their cost of communicating information to logistics providers but also motivated consumers to actively track the progress of their deliveries. Based on the literature and considering the effect of BM Efficiency on firm performance, in this research, the following hypotheses were formulated to check the effect of BM Efficiency on startup performance.

H2a: Increase in efficiency-centered business model design is positively associated with the growth in the number of FTE.

H2b: Increase in efficiency-centered business model design is positively associated with the startup's change in revenue.

A firm thus needs to have a distinct business model so that it can create and capture more value for its shareholders than its competitors [Zott and Amit, 2008]. Further expanding the literature, the authors indicated that both business models and market strategies affect the firm performance. Studies by other researchers in later years, on established firms (i.e., Zott and Amit [2008]; Gronum et al. [2016]; Verbeeten and Boons [2009]; Islami et al. [2020]) and startups (i.e., Balboni et al. [2019]; Zott and Amit [2007]; Slavik et al. [2020]), have also shown the varying influence of business models and competitive strategies on the performance of the firm. Hence, this research next looks to formulate hypotheses to observe the influence of competitive strategies on firm performance.

The organizational outlook of these strategies is that cost-leadership or the ”Low-cost” strategy is aimed at providing incremental growth in the organizational performance. It focuses on reducing its cost by opting for a more standardized process so that the company can produce and distribute its products and services at a lower cost than its competition while still providing comparative or superior quality of products or services against the competition [Islami et al., 2020]. High efficiency, minimal overhead, restricted benefits, waste intolerance, stringent budget screening, broad spans of control, cost containment incentives, and staff engagement in cost management are all hallmarks of a successful low-cost approach [David, 2011]. This aligns with the findings of Porter [1985], who also found a positive relationship between cost-leadership and firm performance, suggesting that the low-cost strategy can help firms gain a stable competitive advantage. Therefore, this research hypothesizes that cost-leadership has a positive impact on firm performance. However, it's worth noting that strategists should exercise caution while pursuing a low-cost strategy, as it does not give a permanent competitive advantage to organizations that utilize low-cost [Islami et al., 2020]. Low-cost strategies must accomplish their competitive advantage in a way that competitors find difficult to imitate or equal. Despite some prior studies being unable to identify a positive correlation between these variables (such as the research of Kharub et al. [2019]), the collective evidence suggests a potential beneficial impact of implementing a cost-leadership strategy on overall firm performance. Therefore, this study proposes the following hypotheses.

H3a: Increase in cost-leadership strategy is positively associated with the growth in the number of FTE.

H3b: Increase in cost-leadership strategy is positively associated with the startup's change in revenue.

Consequently, in the case of differentiation strategy, the organizations see the risk of constantly finding ways to differentiate their products and services from their competitors. Organizations following the differentiation strategy, focus on providing higher customer service and gaining customer loyalty. These organizations do not necessarily focus on lowering the cost of the product or service but still have loyal customers willing to pay higher for products and services meeting their requirements [Islami et al., 2020]. An effective differentiation strategy would result in more product flexibility, compatibility, reduced prices, better service, less maintenance, innovation, and technological advances, an organization's brand value, greater convenience, and other features [Thompson, 2008]. Porter [1980] stated that by using a differentiation strategy, firms have realized higher incomes and customer loyalty compared to the competition because of trust, quality, and the perception of clients for the firm's products and/or services. Additionally, the author found the relationship between differentiation strategy and firm performance to be positive. David [2011] also mentioned that the differentiation strategy does not safeguard the firm for a long time, due to the imitation of the differentiation strategy over time. Considering these insights into differentiation strategy and its effects on firm performance, this study formulates the following hypotheses to analyze and further explain the connections between differentiation strategy and its possible effect on firm performance.

H4a: Increase in differentiation strategy is positively associated with the growth in the number of FTE.

H4b: Increase in differentiation strategy is positively associated with the startup's change in revenue.

Further, based on existing research, it is evident that organizations may profit significantly by strategically using the complementary potential of BM and CS in combination. In their research paper, Zott et al. provided empirical evidence for this theory. They demonstrated that combining BM novelty with a differentiation strategy greatly improved business performance. This discovery highlights the enormous potential for an advantageous interplay between business models and competitive strategies. Given the compelling evidence of interaction effects between these essential variables—Business Models (novelty and efficiency) and Competitive Strategies (cost-leadership and differentiation), this study develops hypotheses that delve deeper into these complementary relationships. The conceptual model, as depicted in figure 3.2, underpins this study by illustrating the direct and interaction effects of business models (Novelty-Centered and Efficiency-Centered) and competitive strategies (Cost-Leadership and Differentiation) on the performance of Dutch high-tech startups, measured through factors such as growth in Full-Time Equivalents (FTE) and changes in revenue. This comprehensive framework also accommodates all the hypotheses developed in this study, which are rigorously analyzed to generate insights from the collected data.

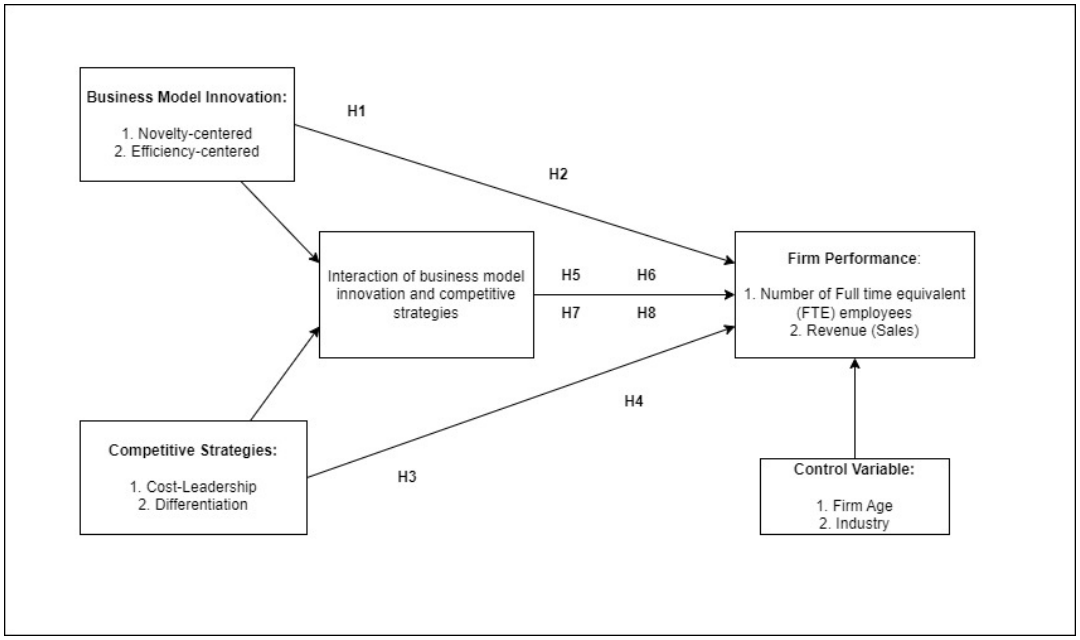

Figure 3.2: Conceptual Model

The combination of a Novelty-Centered Business Model and a Cost-Leadership may have a significant impact on a firm's competitive position and performance. This relationship can increase the company's bargaining power with its suppliers. The firm can attract new clients and create higher transactional efficiency by delivering innovative items and services at attractive price points. As the firm would offer novel products and services at lower prices, it will be able to attract new customers and engage in transactions, which will positively affect the firm performance [Zott and Amit, 2008]. This interaction provides innovative transaction pro-

cesses that function at reduced costs, encouraging customers to change their behavior. The enticing mix of innovation and cost-effectiveness challenges the traditional value proposition. Customers are more likely to transact when lured by new offers and competitive pricing. In summary, combining a Novelty-Centered Business Model with a Cost-Leadership approach not only increases the firm's market attractiveness but also initiates a virtuous circle of customer engagement, cost savings, and total value generation. As this growth in transaction volume, fueled by the beneficial relationship between BM Novelty and cost leadership, contributes to the firm's success, this research formulates the following hypotheses.

H5a: Interaction between novelty-centered business model design and cost-leadership strategy is positively associated with the growth in the number of FTE.

H5b: Interaction between novelty-centered business model design and cost-leadership strategy is positively associated with the startup's change in revenue.

With its emphasis on process optimization and efficiency creation, an efficiency-centered business model has a strong resemblance to the features of a cost-leadership strategy. BM Efficiency and cost-leadership strategies are concerned with reducing costs and creating value in the most cost-effective methods possible. The combination indicates that businesses that embrace BM Efficiency inevitably emphasize cost-efficiency in all aspects of their operations, echoing the basic concepts of a cost-leadership strategy. These companies may progressively lower their cost expenditure over time by continually focusing on cost reductions and operating in a lean, cost-effective way, hence benefiting the firm's overall performance. Although the study of Zott and Amit [2008] did not establish this significant link, this study, based on the harmony between the variables BM efficiency and cost-leadership strategy, believes that this complementary effect will result in a positive impact on the firm performance based on the characteristics of BM efficiency and cost-leadership strategy.

H6a: Interaction between efficiency-centered business model design and cost-leadership strategy is positively associated with the growth in the number of FTE.

H6b: Interaction between efficiency-centered business model design and cost-leadership strategy is positively associated with the startup's change in revenue.

When focusing on high-tech startups, their intrinsic attributes often lead them to adopt a novel business model design in conjunction with a differentiation strategy, especially in their early stages. The nature of their new product and service offerings, which often necessitate distinctiveness from current market choices, drives this alignment. Such an interaction effect has the potential to have a major beneficial impact on firm performance. This combination of an innovative business model design with a differentiation strategy may boost a firm's competitiveness, consumer attractiveness, market positioning, market share, and customer happiness, portraying a more favorable perception of the firm. As a result, company performance is likely to improve significantly, emphasizing the necessity of understanding these dynamic interactions. In an extensive research examining a sample of 170 established enterprises, Zott and Amit [2008] discovered a strong positive interaction impact between a novelty-centered business model design and a differentiation strategy. This critical conclusion revealed that the combination of a novelty-centered business model and a differentiation strategy had a quantifiable influence on firm performance for these established enterprises. Given this theoretical background, a comparable interaction effect between initial differentiation and initial novelty might emerge in the case of Dutch high-tech startups.

H7a: Interaction between novelty-centered business model design and differentiation strategy is positively associated with the growth in the number of FTE.

H7b: Interaction between novelty-centered business model design and differentiation strategy is positively associated with the startup's change in revenue.

Lastly, the interaction between BM efficiency and a differentiation strategy presents an intriguing dynamic. As both variables have diverse properties, it is difficult to establish a solid correlation between them. However, as firms typically have a remarkable ability to innovate and adapt their BM and CS, they often try out combinations of BM and CS which are not traditional, to gain a competitive advantage. Further, in terms of the interplay between BM efficiency and cost-leadership strategy, [Zott and Amit, 2008], find no significance for this interaction on firm performance. Even though the characteristics of BM efficiency and differentiation strategy are fundamentally different, firms may implement the BM efficiency and differentiation strategy in parallel. When conducted correctly, this interaction can set off a chain reaction of beneficial impacts on firm performance. Process optimization not only cuts costs but also gives businesses the flexibility to innovate and satisfy customer requirements. As a result, firms enhance their competitiveness, consumer happiness, and market share. This alignment could thus enhance the entire firm's performance, benefiting the firm greatly. Therefore, emphasizing the strategic relevance of the connection between BM efficiency and a differentiation strategy in the competitive market setting, the following hypotheses were formulated.

H8a: Interaction between efficiency-centered business model design and differentiation strategy is positively associated with the growth in the number of FTE.

H8b: Interaction between efficiency-centered business model design and differentiation strategy is positively associated with the startup's change in revenue.

In conclusion, this chapter creates the framework for this research by developing these 16 hypotheses (eight for each dependent variable) which will be extensively examined utilizing the collected data of Dutch high-tech startups. The following chapter, "Data Collection," which focuses on the collected data and procedures followed, is the next critical part of this research. This current chapter provides the framework and sheds light on the multidimensional dynamics of strategic management in current business environments by unraveling the deep linkages between business model design, competitive strategy, and firm performance, which will be tested statistically.

4

Data Collection

4.1. Research context and Sample characteristics

This chapter delves into the data collection and the procedures used for data collection, which are needed before performing the analysis. This collected data will help in testing the hypotheses which will eventually help in answering the main research question. To test the hypotheses, a cross-sectional study of Dutch high-tech startups was performed. The data was primarily collected from high-tech startups established between 2017 and 2020. This study utilized a quantitative research design to examine the high-tech startups in the sample population and employed a combination of convenience sampling and purposive sampling to select the participants.

It was important to look at the Dutch startup database to identify the relevant startups for this study. However, due to the Dutch startup database being inaccessible at the time of this research, the Dutch facilitators database[1] was utilized to identify relevant high-tech startups. To ensure a varied representation of startups, facilitators were chosen at random. While some facilitators had tie-ups with universities in the Netherlands, including ”YES!Delft,” ”ACE,” ”StartLife,” ”UtechtInc,” and ”NovelT,” others too were based on the research scope and relevance to high-tech startups (for instance, ”HighTechXL”). Additionally, startups not affiliated with these specific incubators were sourced from various online platforms, ensuring a comprehensive selection process aligned with the research scope (high-tech startups established between in 2017 and 2020 in the Netherlands). This method aimed to capture a broad spectrum of high-tech startups, regardless of their incubator affiliation, to enrich our dataset and provide a more nuanced analysis. Based on this sampling method, a complete list of 204 high-tech startups was created, which primarily comprised of startups from the facilitators and a few taken from the internet. Despite having contacted all the incubators and startups in the sample, not all responded and with the information available on the internet a database was created using the Microsoft Excel tool[2].

A combination of convenience and purposive sampling was thus undertaken to select the participants of this study. This implies that the sample is created based on certain character-

[1]Website Link: https://english.rvo.nl/topics/residence-permit/facilitator
[2]Microsoft Excel Version: Microsoft® Excel® for Microsoft 365 MSO (Version 2401)

istics (scope of this research, like firm age and the industry) and the ease of accessibility of collecting the data. Factors such as geographical proximity (to the startup location), availability, and willingness to participate were chosen for their ease of accessibility and practicality in data collection. Purposive sampling was employed by considering the firms' age and industry. Further, as this study focuses on high-tech startups established in the Netherlands between 2017 and 2020, taking into account a lag time of two years is considered sufficient, as most startups fail in the first 18 months [Behnke and Kibbel, 2017] before the startups enter the market with their products and services. By incorporating purposive sampling, this research ensured that the sample represents startups within the desired time frame (sampling frame) and is aligned with the research objectives.

4.1.1. Survey Questionnaire

For data collection, a short survey questionnaire was created (as seen in appendix B.1) to gather the responses for measuring the change in firm performance by the particular business models (BM's) and strategies (CS's). Startups were contacted, and this short survey comprising ten questions was provided to the startup founders or the team members with the required knowledge. The entire process for data collection was managed using Microsoft Forms[3], and the collected data was exported to Microsoft Excel, where the information was tabulated and organized. Following the approach of Gronum et al. [2016], a survey questionnaire based on existing literature (primarily derived from, Zott and Amit [2008]; Balboni et al. [2019]) to measure the variables of interest was developed. The questionnaire consisted of 38 questions; the first 2 questions were to take the respondent's startup name and age information. Next, 32 Likert-scale items rated on a 5-point scale from "Strongly Disagree" to "Strongly Agree," were created. These Likert-scale items focused on capturing changes in BM and CS employed by high-tech startups. The Likert questions asked the startups about the characteristics of their business model when the company was founded and the characteristics of their current business model. Similarly, questions were proposed for measuring the firm's initial and current strategy (see survey B.1). The responses to these Likert-scale questions will be used to analyze the independent variables. Lastly, there were 4 questions to address the dependent variable, firm performance. Two questions were assigned to address the change in firm performance; for each variable Growth in FTE (Full Time Equivalent Employees) and Change in Revenue. The questions offered simple drop-down numerical range answer choices for the participants to select from (see appendix B.1).

Of the 32 Likert-scale questions, the first ten questions measured the response for the business model opted by the startup, initially. These ten questions comprised five questions for each business model, i.e., novelty and efficiency, which were used to measure the type of business model used by the high-tech startup. The following ten questions were the same as before, just in a different context, that is, asking the startups about their current business model, that is, their business model "today." Here, too, are the ten questions comprised of five questions for each business model. The remaining twelve questions looked to collect responses for the startup's strategic choice at two-time frames: current year and founding year. Six questions were assigned for each time frame. Of these six questions, three questions checked if the startup opted for the cost-leadership strategy, and the next three questions checked if the startup opted for the differentiation strategy. These 32 Likert-scale questions measure the independent variable, and their measurement will be used for the analysis with the dependent variables (as seen in B.1). The dependent variables were measured in numerical

[3]Website Link: https://forms.office.com/

ranges to reduce survey fatigue, promote response rate, and make the respondents more comfortable in providing the answers (as it takes less effort to remember and conceal their exact details).

Data for the independent and dependent variables were collected at two points: the initial stage (founding year of the company) and the current stage (when the survey was administered). This study used a multi-pronged approach to gather data, like printouts, email, and Computer-Assisted Telephone Interview (CATI) techniques. A total of 15 participants filled out the printed forms, while the majority of respondents (41 participants) completed the survey questionnaire using the online survey form provided by email. Microsoft Forms, an effective online survey tool, was used to create online survey forms and collect data from the respondents contacted via email and CATI. These techniques enabled a seamless acquisition of responses to the required questions and the data collected using these techniques was structured and organized in Excel for in-depth analysis. Most responses were received within four to six weeks span, with a few responses a little later, but still all responses were received within the data collection phase.

4.1.2. Sample Data

In keeping with the scope of the research, 204 high-tech firms were included in the survey outreach for this study. 56 startups in total filled the survey, by providing their valuable information. Seven of these filled questionnaires did not correspond with the research's scope (as there was a mismatch between the data available and the data provided by the startup), as the startups were not established between 2017 and 2020. As a result, 49 valid survey responses remained, creating the data set for further investigation of both dependent and independent variables. However, a total of 148 startups did not respond to the survey. 13 of the startups declined to participate, stating different reasons such as time restrictions or a lack of interest in study participation. Furthermore, 30 startups could not be reached for participation, while the rest of 105 startups were contacted but opted not to complete the survey. This presented a response rate of 27.45% for this survey questionnaire's total outreach. This response rate is consistent with quantitative research acceptability requirements [Balboni et al., 2019], confirming the robustness of the data gathered for the study.

By incorporating convenience and purposive sampling, this research aimed to create a sample that was accessible for data collection and aligned with our research objectives, allowing the gathering of relevant and comprehensive data from Dutch high-tech startups. To ensure data validity, respondents' profiles were checked, and they were asked if they possessed the relevant knowledge (implying they are involved in the startup's strategic activities) concerning this research study. The majority of the respondents are founders, although a few survey questionnaires have been filled out by other team members possessing the relevant knowledge.

Table 4.1 provides the fundamental information that can be inferred from the sampling data. As the research looks at the competitive high-tech industries in the Netherlands, the final sample of 49 high-tech startups was divided into five industries based on the dominant high-tech sectors in the Netherlands and the responses received, namely, Technology and IT Services (38.78%), Manufacturing and Engineering (24.49%), Medical Equipment and Healthcare (14.29%), Renewables and Environment (6.12%), and Others (16.33%). The choice of these industries—Technology and Information Technology Services, Manufacturing and En-

gineering, Medical Equipment and Healthcare, Renewables and Environment, and Others—is made because these industries are critical to the Dutch innovation system and, hence, its economic development and technical advancement. Thus, these categories are selected in this research due to their importance and the competitiveness of these industry types. Furthermore, for the ease of categorizing information, industries whose fewer responses were received were grouped as ”Others.” The ”Others” category comprises startups from other competitive industries, like Advertising services, Construction, Food Tech, etc.

Description	Category	Percentage
Industries	Technology and IT Services	38.78%
	Manufacturing and Engineering	24.49%
	Medical Equipment and Healthcare	14.29%
	Renewables and Environment	6.12%
	Others	16.33%
Firm age	2017	20.41%
(Year of establishment)	2018	20.41%
	2019	34.69%
	2020	24.49%
Firm Size	Less than 8	95.92%
(Initial firm size, when the startup was founded)	Between 8 and 20	4.08%
	Between 20 and 50	0.00%
	More than 50	0.00%
Firm Size	Less than 8	48.98%
(Current firm size, when the survey was addressed)	Between 8 and 20	34.69%
	Between 20 and 50	12.24%
	More than 50	4.08%
Change in Revenue	Not Applicable	30.61%
(Since the startup was founded)	Slight Decrease	0.00%
	Significant Decrease	0.00%
	Neither Increase or Decrease	16.33%
	Slight Increase	24.49%
	Significant Increase	28.57%
Percentage Change in Revenue	Not Applicable	28.57%
(Since the startup was founded)	0% to 25%	26.53%
	26% to 50%	12.24%
	51% to 75%	6.12%
	76% to 100%	4.08%
	More than 100%	22.45%

Table 4.1: Sampling Data Analysis

Further, from the sampling table 4.1, it can be observed that the almost equal number of firms, for each year of establishment- 2017 (20.41%), 2018 (20.41%), and 2020 (24.49%)- responded to the survey questionnaire, with the number of responses received slightly higher for the startups established in 2019 (34.69%). Another interesting observation is that the initial firm size for 95.92% of the startups was less than 8 full-time employees, with only 4.08% or two firms having between 8 and 20 full-time employees at the startup when it was established. However, these numbers changed drastically when the current firm size of the startup was

measured. More than 50% of the startups had more than 8 employees, while the percentage of startups still with less than 8 employees was reduced to 48.98% from 95.92%. In the current firm size data, it can be seen that a few startups (4.08%) have grown substantially in size, with the number of employees being more than 50 (as the initial number was less than 8). sis of the revenue change indicates that startups either experienced an increase in revenue (for 63.39% of startups) or found the revenue question ”not applicable,” suggesting they have yet to commercialize their products and services. Consequently, the percentage change in revenue shows that more than 70% of the startups in the sample demonstrated an increase in revenue, with 22.45% experiencing growth exceeding 100%. Conversely, 28.57% of the startups did not experience any revenue growth since their establishment. Following this sampling data analysis, and prior to in-depth analysis, the check for biases is done to confirm the reliability and validity of the data.

4.1.3. Sample Biases

This research checks for biases that are generally applied to quantitative research, like selection bias, and common method bias. In the context of selection bias, the research design takes careful measures to mitigate its potential impact. This cross-sectional research involved the retrospective collection of data regarding the business models and strategies employed by the respondents. The data was collected at two distinct time points: first, during the startup's inception, and second, at the time of the survey. To address the potential selection bias associated with retrospective data collection, techniques akin to those employed in Balboni et al. [2019] research were adopted. Furthermore, to minimize any selection bias, respondents were specifically asked to recall details related to the initial and current business model and strategy choices when completing the survey. This approach was designed to reduce the risk of informant fallibility. As the survey questionnaire focused on the strategic changes occurring within startups, the responses also are less susceptible to cognitive bias. These strategic alterations not only bolster the reliability of retrospectively collected data but also function as a means to alleviate the potential impact of selection bias.

Further following the research of [Balboni et al., 2019], to address the potential for common method bias, both ex-ante survey design choices and ex-post analyses. Regarding ex-ante research design, following the recommendation of Conway and Lance [2010], the survey questionnaire was addressed to a single respondent in each firm rather than multiple respondents, as our study focuses primarily on startups, where only one person meets the participant criteria. Further to check the possibility for common method bias, Harman's single factor test was performed [Podsakoff et al., 2003]. This test checks if the number of items can be grouped into a single variable and thus assesses the validity of the scale. This test checks if two or more scales are measuring the same item. When performing this test, all item-scale variables were loaded into a single-factor analysis to check for the variance due to a single factor. Harman's single-factor analysis was done in SPSS software[4] as it provides the necessary tools for calculating the variance. The variance, when accounted as a single factor, is calculated, as seen in table 4.2, and this value should be below the threshold of 50%. The single-factor analysis shows that the variables account for 24.40% of the variance, which is way below the threshold, thereby indicating against the risk of common method bias.

[4]SPSS Software Version: IBM SPSS Statistics Version 26

Total Variance Explained						
		Initial Eigenvalues		Extraction Sum of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.453	26.415	26.415	7.808	24.400	24.400
2	3.061	9.566	35.981			
3	2.935	9.173	45.153			
4	2.411	7.533	52.687			
5	2.128	6.651	59.338			
6	1.701	5.315	64.653			
7	1.504	4.700	69.353			
8	1.201	3.752	73.105			
9	1.068	3.338	76.443			
10	1.015	3.171	79.614			
11	.866	2.707	82.321			
12	.764	2.386	84.707			
13	.693	2.167	86.874			
14	.613	1.916	88.791			
15	.543	1.695	90.486			
16	.461	1.439	91.925			
17	.419	1.309	93.234			
18	.332	1.037	94.271			
19	.307	.960	95.231			
20	.254	.794	96.025			
21	.230	.720	96.745			
22	.193	.602	97.347			
23	.180	.562	97.909			
24	.166	.518	98.427			
25	.131	.409	98.837			
26	.115	.360	99.197			
27	.070	.219	99.416			
28	.063	.198	99.615			
29	.045	.140	99.755			
30	.034	.105	99.860			
31	.028	.089	99.949			
32	.016	.051	100.000			

Extraction Method: Principal Axis Factoring.

Table 4.2: Harman's Single Factor test

4.2. Measurements

4.2.1. Dependent Variable

The dependent variable of this study is the firm performance. Startups' performance is measured by measuring the growth in the number of full-time equivalent employees (FTE) and the increase in revenue, as these are the most relevant performance indicators when researching startups. Startup firm performance was measured by asking respondents about their firm's characteristics and outcomes. The questions aimed to provide information on the initial and current number of full-time equivalent employees. This collected data is then operationalized to calculate the change in the Growth in FTE, the dependent variable of startup performance. This operationalized value is computed by taking the difference between the current and the initial number of employees as the average annual compound growth rate considering the age of the startup. As numerical-range answer choices are selected, the mid-point values are considered for calculations. Using mid-point values within numerical ranges is a common and effective technique in quantitative research. The ranges provided were as follows, "Less than 8," "Between 8 and 20," "Between 21 and 50," and "more than 50". This approach facilitates making statistical calculations straightforward and ensures data consistency. Furthermore, this method facilitates data reduction and increases clarity when conducting quantitative research, making it a key step for assuring precision and consistency in the context of numerical ranges. Hence, Growth in FTE is an objective measure of a startup's performance for attaining a feasible scale of operations and indicating its organizational growth.

The next dependent variable is the change in Revenue. Similar to the Growth in FTE variable, this variable was measured using numerical-range answer choices. The ranges provided were as follows, "0% to 25%," "26% to 50%," "51% to 75%," "76% to 100%," "More than 100%," and "Not Applicable". These values were also operationalized in the exact same method as the first dependent variable, and the mid-point values were calculated as the question measures the change in revenue and used for further analysis. Other performance metrics are available to measure the startup's performance, but the most commonly used metrics are the number of employees and revenue (sales). Other financial measurements of firm performance, Profitability and Market value were also disregarded, as most startups and new ventures require a longer time to be profitable and generate some market value. With profitability varying inconsistently during the early stages of the startup and startups that initially have negligent or unknown market value, thus these factors were also excluded from the choice of the dependent variable. Hence contrasting to [Zott and Amit, 2008], which used stock market value or market capitalization as the performance metric, this research measures growth by change in number of FTE's and change in revenue as a more relevant growth metric in the case of startups [Rompho, 2018; McKelvie and Wiklund, 2010]. Additionally, because sales growth rates are predicated on the availability of products and services in the market, which may take years to develop in some high-tech fields such as biotechnology (for example, technology to cure cancer), thereby excluding these startup types (solely R&D firms) from the scope of this research. Consequently, these measures of firm performance collectively aid in measuring the change in the startup's development (Growth in FTE) and earnings (Change in Revenue) with respect to each independent variable and their combinations.

4.2.2. Independent Variables

The independent variables studied in this research are Business Model Novelty, Business Model Efficiency, Cost-Leadership strategy, and Differentiation strategy. All these variables were measured using a multi-item 5-point Likert scale primarily adapted from, Balboni et al. [2019] and Zott and Amit [2008]. As the research analyzes the change in performance at two points of time (initial and current), similarly, the change in the independent variables (all four) is also measured across the same two points of time. A Likert-item scale for each time point and variable was assessed. The Likert-item scale for business model novelty assesses the firm's ability to offer new combinations of products and services, linking participants to products and services, and continuously introducing innovation in their business model. The five-item scale for business model efficiency assesses the firm's ability to minimize costs, reduce errors in transactions, and handle all transactions efficiently.

Similarly for the strategy variables, Cost-Leadership and Differentiation, a three-item scale (each) was used to assess the variables at both the points of time (initial and current). The three-item scale for cost-leadership strategy assesses the firm's strategic choice of offering products and services at a lower price than competition, minimizing all expenditures, and focusing on standardization. However, the three-item scale for differentiation assesses the firm's strategic choices of new product development, branding and marketing, and collaborations with R&D or technology-intensive firms (as this study deals with high-tech startups). The respondents hence described the BM design themes and CS used by the startup by answering the Likert-scale questions, and their responses evaluated the levels of business model novelty, business model efficiency, cost-leadership strategy, and differentiation strategy implemented by the startup when planning for market entry. Following the changes being measured at time-frame, T0, and T1, the temporal dimension for change in each of the four independent variables (novelty, efficiency, cost-leadership, and differentiation, at both time points) was measured by the difference in the variables at time T1 (when the survey was addressed) and T0 (time of foundation) [Balboni et al., 2019].

Following the work of Balboni et al. [2019] and Zott and Amit [2008], the interaction effects are measured as a combined effect of both variables. The research looks into the interaction between the four variables in all possible combinations to examine the joint effect of BM and CS on the high-tech startups' performance: Novelty-centered BM and Differentiation strategy, Efficiency-centered BM and Differentiation strategy, Novelty-centered BM and Cost-leadership strategy, and Efficiency-centered BM and Cost-leadership strategy. This measure is consistent with previous research on the interaction effect between BM and CS [Zott and Amit, 2008]. These interaction terms aim to indicate if there is an effect on the firm performance due to the combination of a particular business model and a particular strategy. Next, before operationalizing the interaction terms, efficiency, novelty, cost-leadership, and differentiation are mean-centered (using factor analysis) to reduce the covariance between the linear and interaction terms [Echambadi and Hess, 2007]. The responses to the questions measuring the initial business models and initial strategies were used to generate the values for these interaction variables. This generated value will be used for further analysis with the dependent variable.

4.2.3. Control Variables

This study adopts a systematic approach to improve the robustness and reliability of the findings by incorporating two control variables, namely, Firm age and Industry. The first control variable, firm age, provides insights into the study's time frame. The firm age ranges from three to six years. It's three years for firms established in 2020 and six years for startups established in 2017. This temporal component is essential for comprehending the growth of startups over time. As organizations grow, their strategies may undergo major modifications and adjustments, allowing researchers to investigate how a firm's age might affect its development and income. The second control variable, Industry, is essential in assessing the competitive landscape. Industries are selected based on their competitive nature in creating an impact on the performance of the startup. Controlling for industry-specific factors, this research observes the link between BM novelty, BM efficiency, cost-leadership strategy, differentiation strategy, and firm performance.

A six-year period was determined to be a suitable span, considering the age of the startups involved in this research. This decision aimed to accurately capture the development of startups beyond their initial stages, which are characterized by market validation and prototyping rather than scaling up. This approach, inspired by Balboni et al. [2019], incorporated a time lag (from 2017 to 2020) following the startup's establishment to assess the firm's growth. This operationalization offers a more objective performance evaluation in monitoring the increase of FTE and revenue change, which are crucial for entrepreneurial firms striving to attain a minimum sustainable scale of operations rapidly. This research delves into the analysis and findings discussed in the following chapters using these variables. These variables lay the groundwork for a more in-depth examination of the numerous relationships and interactions of the startups' business models and strategies. The next chapter analyzes the data to identify patterns and derive important insights to expand the knowledge of how these variables interact and affect the growth of high-tech startups in the Netherlands.

5

Analysis

This chapter further delves into the analysis performed on the sample data. After performing the check for reliability and other biases, further analysis is performed to measure the relationship between independent and dependent variables. Therefore, standard statistical procedures were followed to measure the change in the dependent variables by the independent variables. Hence, the data collected was first organized using the Microsoft Excel tool to continue with the analysis, and a check for any missing data was performed. Upon clearing this check and organizing the data, set values were assigned to the responses to ease the calculations when performing the analysis. The complete analysis was performed in SPSS due to its significance in carrying out statistical analysis.

For performing this analysis, the data from the survey, which is collected using Likert-item scale questions, is coded with appropriate values for each Likert-scale option choice. Following the general norm in coding while using these psychometric tests, the value ”1” was considered low, and ”5” was considered high. Consequently, ”1” denoted ”Strongly Disagree” and ”5” denoted ”Strongly Agree” option choices, respectively, and the rest values were coded in increasing order; ”2” was assigned to ”Disagree,” ”3” assigned to ”Neither Agree or Disagree,” and ”4” assigned to ”Agree.” Next, exploratory factor analysis (EFA) is performed on these variables, business models (BM’s), and competitive strategies (CS’s), to obtain standardized scores for each construct, to be operationalized before using it for subsequent analyses. Using these standardized values, further calculations were done to calculate the variables to answer the eight hypotheses and, eventually, the research question. These calculations compute for the increase in all four independent variables (BM Novelty, BM Efficiency, Cost-Leadership strategy, Differentiation strategy) and the interaction effects between these variables. The increase for each independent variable is measured by taking the difference between the ”current” and the ”initial” construct of each independent variable. At the same time, the interaction terms are calculated, by operationalizing the combination of each business model with each competitive strategy. These fundamental procedures aim to provide a reliable groundwork for the statistical analysis.

To perform the analysis using SPSS, the data from Excel was first converted to fit the SPSS format. In SPSS, appropriate scales were assigned to all the variables being analyzed. The ”Industry” variable is assigned the ”nominal” scale measurement, and all the Likert-scale questions representing each construct, have been assigned to the ”ordinal” scale measure-

ment. The 5-point Likert-scale questions, (measure the response in the range from ”Strongly Disagree” to ”Strongly Agree”) are assigned the ordinal scale, as the responses ranked express a ”greater than” relationship. While, the remaining variables- Firm Age, Growth in FTE (Full Time Equivalent Employees), Change in Revenue, and the fundamental calculations in Excel- were all assigned the ”scale” measurement in SPSS, as the data possesses meaningful relative distance between the points for finding and predicting the relationship between the independent and dependent variables [Boone Jr and Boone, 2012].

5.1. Exploratory Factor Analysis

Factor analysis is an essential research procedure that seeks to identify the underlying constructs in the observed data and to determine the dimensionality or structure of these constructs. It helps with theory construction, psychometric instrument creation, and data reduction by discovering clusters of inter-correlated variables known as ”factors” or ”latent variables.” The first step in doing Exploratory Factor Analysis (EFA) is to standardize observable variables (mean of zero and standard deviation of 1) and analyze the correlation matrix between these items [Mailman School of Public Health, 2023]. EFA was carried out using SPSS to discover the latent variables. EFA intends to identify distinctive factors within the research framework. It sought to identify and characterize the following constructs: initial BM novelty, initial BM efficiency, initial cost-leadership strategy, initial differentiation strategy, current BM novelty, current BM efficiency, current cost-leadership strategy, and current differentiation strategy. This analysis aimed to give structure and clarity by identifying these important components for further investigation and comprehending their significance in the research context. All the items for each construct were loaded into SPSS to find the factor loadings and factor score.

The obtained factor loadings are essential for comprehending the relationships between variables and constructs. Subsequent computations will be carried out using the factor scores to address the research question. Table 5.1 shows the factor loadings that were determined after this analysis was completed. The research revealed that all constructs, except Initial Business Model Novelty, had adequate factor loadings that met or exceeded the 0.30 criterion. It’s interesting to note that Initial BM Novelty showed loadings in two components, suggesting that interpretation might be complicated. The Varimax rotation approach was utilized to clarify and improve the understanding of these results, as it is effective in optimizing high and low factor loadings while decreasing mid-range factor loadings [Robbins, 2005]. By altering factor loadings for a more thorough comprehension of the relevant notions, this method was used to improve the results’ coherence and clarity. Despite the rotation, the outcome still showed two components, indicating that not all items were loaded uniformly onto a single component. The first component had two loadings for the measured items below 0.3, with the lowest loading at 0.255. The second component however consisted of all negative factor loadings. Consequently, considering the research objective’s alignment with the identified components, the second component was disregarded due to its relevance to the research [Field, 2009]. Additionally, factor scores are generated in SPSS to operationalize these findings into appropriate variables. These variables are critical in quantifying the influence of BM and CS on startup performance, providing substantial insights into the research topic.

No.	Item	IBMN	IBME	ICS	ID	CBMN	CBME	CCS	CD
	Initial Scenario:								
1.	Offering new combinations of products, services and information to its customers	0.291							
2.	Integrating a wide variety of stakeholders and products	0.733							
3.	Linking customers to the products and services in uncommon ways	0.734							
4.	Continuously introducing innovations to make the business model more effective	0.255							
5.	Creating a unique business model	0.781							
6.	Simplifying the transactions between customer and the company		0.596						
7.	A low error rate in the execution of the transactions		0.801						
8.	Minimizing stakeholder costs (marketing, sales, transactions)		0.598						
9.	Handling small as well as large transaction volumes		0.786						
10.	Offering high transaction efficiency		0.861						
11.	Offering products/ services at low/lower prices than competition			0.779					
12.	Minimizing product/ service-related expenditure, in particular using process innovations			0.819					
13.	Emphasizing economies of scale and scope with products and services			0.760					
14.	New product development, Innovation and R&D activities				0.618				
15.	Branding and advertising as part of company's marketing approach				0.550				
16.	Emphasizing growth by collaborating or merging with R&D/ technology intensive companies				0.777				
	Current Scenario:								
17.	Offering new combinations of products, services and information to its customers					0.667			
18.	Integrating a wide variety of stakeholders and products					0.793			
19.	Linking customers to the products and services in uncommon ways					0.739			
20.	Continuously introducing innovations to make the business model more effective					0.412			
21.	Creating a unique business model					0.697			
22.	Simplifying the transactions between customer and the company						0.714		
23.	A low error rate in the execution of the transactions						0.785		
24.	Minimizing stakeholder costs (marketing, sales, transactions)						0.769		
25.	Handling small as well as large transaction volumes						0.823		
26.	Offering high transaction efficiency						0.876		
27.	Offering products/ services at low/lower prices than competition							0.740	
28.	Minimizing product/ service-related expenditure, in particular using process innovations							0.728	
29.	Emphasizing economies of scale and scope with products and services							0.771	
30.	New product development, Innovation and R&D activities								0.601
31.	Branding and advertising as part of company's marketing approach								0.587
32.	Emphasizing growth by collaborating or merging with R&D/ technology intensive companies								0.753
	Exploratory factor analysis — pattern matrix								

Table 5.1: Exploratory Factor Analysis - Factor Loadings

The abbreviations used in the table above, Table 5.1, indicate the following: ”IBMN” - Initial Business Model Novelty, ”IBME” - Initial Business Model Efficiency, ”ICS” - Initial Cost-Leadership Strategy, ”ID” - Initial Differentiation Strategy, ”CBMN” - Current Business Model Novelty, ”CBME” - Current Business Model Efficiency, ”CCS” - Current Cost-Leadership Strategy, ”CD” - Current Differentiation Strategy.

5.2. Reliability Analysis

To analyze the effects of the independent variables on the dependent variables, first, the reliability analysis is performed. Reliability analysis checks the internal consistency of the multi-item scales (Likert questions in the survey representing each independent variable). Cornbach's alpha being the reliability coefficient, measures the internal consistency of the Likert-scale items to determine how closely the items relate as a group.

Multi-Scales Variables	Cornbach's Alpha (α)
Initial BM Novelty	0.532
Initial BM Efficiency	0.780
Initial Cost-Leadership Strategy	0.690
Initial Differentiation Strategy	0.318
Current BM Novelty	0.686
Current BM Efficiency	0.851
Current Cost-Leadership Strategy	0.597
Current Differentiation Strategy	0.318

Table 5.2: Reliability Analysis

The reliability analysis in SPSS generated coefficients for all eight constructs, presented in Table 5.2. Particularly, "BM Efficiency" for its initial and current constructs displayed alpha values exceeding 0.7, as evident in Table 5.2. Notably, Cronbach's alpha coefficients for most variables were positive and fell within an acceptable range above 0.5 [Ursachi et al., 2015], except for "Initial Differentiation Strategy" and "Current Differentiation Strategy" which scored 0.318 each. These observed low-reliability values for the differentiation strategy suggest that other factors such as sample size, test length, and a limited number of questions might have influenced these results [Tavakol and Dennick, 2011]. Although only a few variables demonstrated a strong alpha value (higher than 0.7), this study considers all measures reliable (even the weak and moderate alpha values) and indicative of measuring the respective construct, as moderate reliability scores are also considered acceptable and weak reliability scores are also considered acceptable (however it is advised caution when interpreting the results) [Bruton et al., 2000]. Acknowledging the potential constraints affecting the internal consistency of the measures (weak Cronbach's alpha value) will be discussed in subsequent chapters.

5.3. Multi-Collinearity Analysis

Following the measurement of reliability, multi-collinearity was tested in SPSS by calculating and assessing the VIF and tolerance value for each variable in the study. The change variables of business models, competitive strategies, and their interaction terms were tested for multi-collinearity (as shown in table 5.3). Multi-collinearity checks if two or more independent variables in a regression analysis are highly linked, which can cause issues in the study such as unstable coefficient estimates and trouble understanding the impact of individual variables on the dependent variable. The VIF and Tolerance values calculated are used to assess the degree of correlation between the independent variables, using a multiple regression model. High VIF scores and low tolerance values indicate significant multi-collinearity, necessitating adjustments such as eliminating, combining, or modifying variables to enhance the reliability of the regression analysis.

Further, on performing the analysis for multi-collinearity, it was found that the VIF values for all variables are between 1.112 and 1.819, and all Tolerance values are above 0.637. These values are indicative of non-multi-collinearity, as the values obtained are in the acceptable range for both VIF (VIF-value < 10) and Tolerance (Tolerance-value > 0.2). The variable ”Increase in Business Model Novelty” resulted in the lowest VIF value of 1.112 and the highest tolerance of 0.891. While the other terms also showed values in a similar range, as seen in table 5.3. As the values of VIF for all the variables are below 3 and Tolerance above 0.7, the results depict a high degree of non-multi-collinearity, indicating that the data is reliable and can be used for further statistical analysis[1]. Consequently, after completing the reliability and multi-collinearity check, descriptive statistics are calculated.

Variable	Tolerance	VIF
Increase in Business Model Novelty	0.891	1.112
Increase in Business Model Efficiency	0.724	1.382
Increase in Cost-Leadership Strategy	0.734	1.362
Increase in Differentiation Strategy	0.637	1.819
Interaction between Initial BM Novelty and CL Strategy	0.637	1.569
Interaction between Initial BM Novelty and D Strategy	0.721	1.388
Interaction between Initial BM Efficiency and CL Strategy	0.726	1.378
Interaction between Initial BM Efficiency and D Strategy	0.712	1.405

Table 5.3: Check for Multi-Collinearity

5.4. Descriptive Statistics

Continuing the analysis, descriptive statistics (see table 5.4) were performed. Descriptive statistics are used to determine the mean, standard deviation (SD), and skewness of all variables in this research. Descriptive statistics are used to summarize the characteristics of the data of the collected sample set. These computations are performed in SPSS and the output is shown in the table 5.4. The means are calculated by taking the average of the responses, which further aids in calculating the standard deviation. Moreover, the skewness of the data is measured to check the symmetry of the data about the mean. The skewness values are in the range of -1 to +1, which is considered excellent and is indicative of the data being close to complete symmetry.

Description	Mean	Std. Deviation	Skewness	
	Statistic	*Statistic*	*Statistic*	*Std. Error*
Firm Age	4.37	1.074	0.255	0.34
Industry	2.37	1.468	0.767	0.34
Growth in FTE	0.20	0.2395	0.847	0.34
Change in Revenue	40.67	44.7788	0.747	0.34
Increase in Business Model Novelty	0.00	0.662	0.127	0.34
Increase in Business Model Efficiency	0.00	0.589	0.208	0.34
Increase in Cost-leadership strategy	0.00	0.816	0.791	0.34
Increase in Differentiation strategy	0.00	0.783	0.423	0.34
Initial BM Novelty * Initial Cost-leadership Strategy	0.463	0.996	0.583	0.34
Initial BM Novelty * Initial Differentiation Strategy	0.233	0.939	0.127	0.34
Initial BM Efficiency * Initial Cost-leadership Strategy	0.460	0.843	0.669	0.34
Initial BM Efficiency * Initial Differentiation Strategy	0.247	0.974	0.636	0.34
N = 49				

Table 5.4: Descriptive Statistics

[1]Note: The variable names in the table 5.3, ”CL Strategy” denotes Cost-leadership strategy and ”D Strategy” denotes Differentiation strategy

The mean and standard deviation calculations provide the data set's central tendency and variance, respectively. Table 5.4 shows that the dependent variable has a mean of 0.20 and 40.67 for Growth in FTE and Change in Revenue, respectively. This implies that, on average, the growth in the number of full-time employees at the startup was 0.20 or 20%, while the change in revenue over time was 40.67%. The means of the interaction effect variables depicted that the combination of "Initial BM Novelty * Initial Cost-leadership Strategy" was valued higher than "Initial BM Novelty * Initial Differentiation Strategy," 0.463 and 0.233, respectively. Similar was observed for the combination with the second type of business model, the interaction variable "Initial BM Efficiency * Initial Cost-leadership Strategy" scored higher than "Initial BM Efficiency * Initial Differentiation Strategy", 0.460 and 0.247 respectively. Further, it is interesting to note that the mean values for the four direct effect variables- Increase in Business Model Novelty, Increase in Business Model Efficiency, Increase in Cost-leadership strategy, and Increase in Differentiation strategy- are infinitesimally small or zero, suggesting that the scores are equally distributed about the mean without any strong tendency for a particular business model or strategy. It is also interesting to note that the values of the interaction terms involving the cost-leadership strategy had very close means, 0.463 and 0.460, suggesting a higher preference for this strategy.

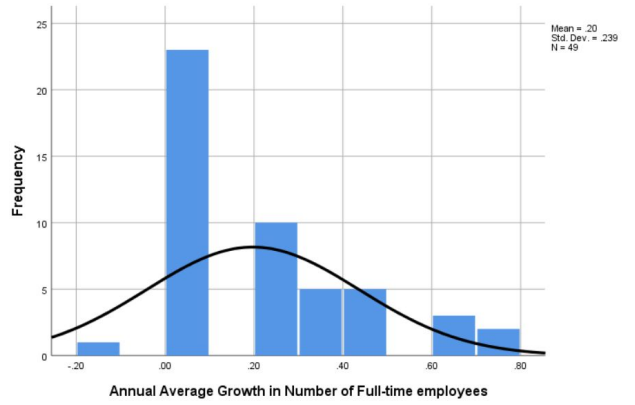

Figure 5.1: Normal Distribution - Growth in FTE

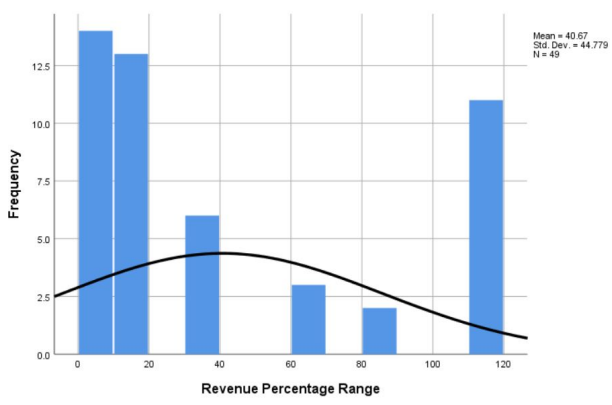

Figure 5.2: Normal Distribution - Change in Revenue

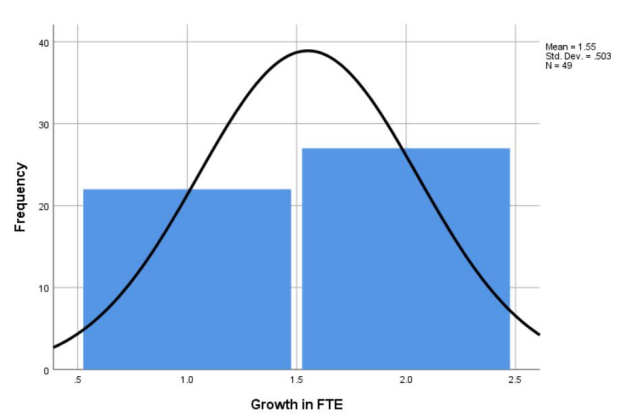

Figure 5.3: Normal Distribution - Growth in FTE (after categorizing)

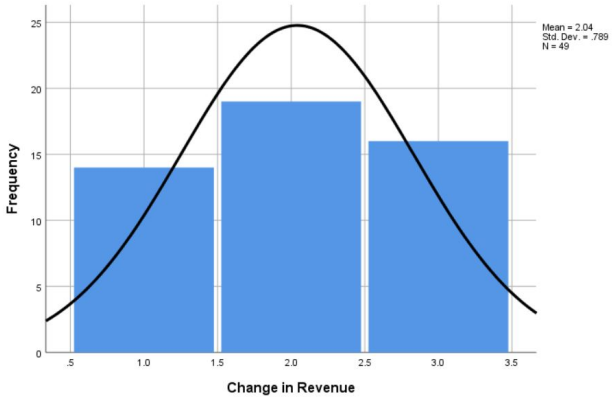

Figure 5.4: Normal Distribution - Change in Revenue (after categorizing)

Next, the standard deviation (SD) values demonstrate the spread in the data. It can be observed that the SD values for all the independent variables are between 0 and 1. However, for the dependent variables, the deviation was considered quite high from the mean, 0.24 and 44.78, as can also be seen from the figures 5.1, and 5.2. As these calculations are indicative of a higher dispersion among the sample data, due to the nature of the data collected, the data of the variables ”Growth in FTE” and ”Change in Revenue” were categorized. Categorizing data based on obvious groups from the normal distribution histogram is a typical method used when conducting statistical analysis [Agresti and Liu, 2001]. However, Altman [2005] advises some caution when using this approach, as the results might have a loss of information, statistical power, and efficacy. Considering the constraint, [Agresti and Liu, 2001] suggests that categorizing data can increase the model's predictive power, improve interpretability, and simplify complex linkages, and this classification can, therefore, be a helpful tool in regression analysis by minimizing the potential drawbacks.

Hence, to minimize these drawbacks, the categorization of data was done keeping the research objective in mind, which is to measure firm performance. Next, based on the figures 5.1 and 5.2, two categories were created for the ”Growth in FTE” variable- ”No Growth”, and ”Significant Growth”-and three for the ”Change in Revenue” variable- ”No Revenue”, ”Slight Increase in Revenue” and ”Significant Increase in Revenue”- in SPSS and were assigned appropriate scale. The number of categories was decided based on the distribution and spread of the data (see appendix A.3.2). Value labels were also set for these categories, ”No Growth” was labeled ”1”, and ”Significant Growth” was labeled ”2”. For the change in revenue variable, the same was done, ”No Revenue” was labeled ”1”, ”Slight Increase in Revenue” was labeled ”2,” and ”Significant Increase in Revenue” was labeled ”3”. Figures 5.3 and 5.4 demonstrate the normal distribution post-categorizing the data. By categorizing the variables into fewer categories, creating categories in line with the research objective (for instance, ”Slight Increase in Revenue”, or ”Significant Growth”), and assigning appropriate scales and labels, this approach thereby aims at reducing the loss of information due to categorizing a variable. After categorizing the data, appropriate descriptive analysis was performed for this categorized variable. As the data of the scale type is categorized, the mode was calculated along with skewness, as seen in table 5.5. The mode of both the variables was ”2,” indicating that the labels ”Significant Growth” and ”Slight Increase in Revenue” occurred in most of the responses collected.

Description	**Mode**	**Skewness**	
	Statistics	*Statistics*	*Std. Error*
Growth in FTE	2	-0.212	0.340
Change in Revenue	2	-0.074	0.340

Table 5.5: Descriptive Statistics - Categorized Variables

Lastly, the variables' skewness was also measured in the descriptive analysis. The skewness values are in the range of -1 to +1, which is considered excellent and is indicative of the data being close to complete symmetry and does not exhibit a strong skew in either direction left or right (positive or negative). The standard error value for all the variables obtained is 0.34, and as the absolute value of skewness is less than twice the standard error of skewness, it indicates that the skewness estimate is not statistically significant and represents a symmetric distribution [Soft, 2008]. This relatively balanced distribution indicates that extreme values do not significantly affect the overall distribution, as seen from the figures for the categorized variables (fig. 5.3 and fig. 5.4) and also in the figures in the appendix A.3.1. These figures depict the data's distribution, mean, standard deviation, and skewness.

5.5. Correlation Analysis

After calculating the central tendencies and variances of the sample data by performing descriptive statistics, correlation analysis is performed to measure the strength and magnitude of the relationship between two variables. Correlation analysis is primarily used to detect trends in data sets. A positive correlation indicates that both variables rise in proportion to one other, whereas a negative correlation indicates that as one variable decreases, the other increases. The correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, +1 indicating a perfect positive correlation, and 0 indicating no correlation. Therefore, correlation analysis is generally used to check if there is a relationship between the independent and dependent variables and aids in predicting the influence of one variable on another.

The correlation table, table 5.6, provides the output of the correlation analysis performed in SPSS. In SPSS, all the variables of the study were inputted in the appropriate format, and bivariate correlation analysis was performed. The correlation coefficient was measured for the variables at two confidence intervals, 95%, and 99% (in line with existing research), to check for a significant relationship or correlation between the two variables. A two-tailed test was conducted, and Pearson's "r" value was calculated; "r" is regarded as the correlation coefficient, and the respective "r" values are mentioned in the correlation output table 5.6.

The "r" values in the correlation table 5.6, show that only the dependent variable, Growth in FTE, showed a positive, moderate, and significant correlation at 95% confidence interval, 0.315, and the rest of the correlations between the independent and dependent variables were not significant at 99% and 95% confidence intervals. This correlation indicates that the initial choice of startups opting for the combination of BM novelty and cost-leadership strategy will also tend towards an increase in the number of employees. The dependent variable, Growth in FTE, shows a low and negative correlation with both change variables of business models, increase in BM Novelty (-0.031), increase in BM efficiency (-0.161), and also for the cost-leadership strategy (-0.041). While for the differentiation strategy and the interaction effect terms, the analysis shows a low yet positive correlation, yet none of these correlations are significant at the 0.05 level. However, the other dependent variable, change in revenue, showed mostly a low and positive correlation with most of the independent variables; except for, an increase in BM efficiency (-0.033), and the interaction terms, initial BM novelty, and initial cost-leadership strategy (-0.178), initial BM efficiency and initial cost-leadership strategy (-0.275), and initial BM efficiency and initial differentiation strategy (-0.154), which is negative and low.

There are three significant correlations at the 95% confidence interval. Between the variables Firm Age and the interaction variable, Initial Business Model Novelty * Initial Cost-leadership Strategy, the correlation obtained is negative and moderate, -0.320, implying that a positive change or increase in firm age will result in a negative change when implementing the combination of business model novelty and cost-leadership strategy. Of the remaining two significant correlations at the 95% confidence interval, one such positive correlation was expected and found between the increase in BM efficiency and an increase in cost-leadership strategy (0.333), based on existing literature and the characteristics of the business model and competitive strategy. The last significant correlation at 95% is between an increase in differentiation strategy and a combination of initial BM efficiency and initial cost-leadership strategy (0.332). Although this correlation is positive and moderate in strength, it is surprising to see a correlation between the terms involving strategy choice, differentiation, and cost-leadership strategy, as these strategies are not generally used in combination. Based on existing literature, researchers have advised against using these in combination, as this can hinder growth.

The correlation table 5.6 also exhibits correlations at a 99% confidence interval. There are a total of four correlations between variables at the 99% interval level. An increase in differentiation strategy shows correlations with two variables, an increase in cost-leadership strategy (0.397), and the combination of Initial BM Novelty and Initial Cost-leadership (0.441), hinting towards a mixed strategic approach, however as discussed previously this mixed approach can hinder growth, hence these correlations could be disregarded. Consequently, the remaining two significant correlations at a 99% confidence interval level were also interesting to note. The relationship between the interaction variables, first, ”Initial BM Efficiency * Initial Cost-leadership,” and, ”Initial BM Novelty * Initial Cost-leadership” (0.384), indicating that an increase in the combination variable of initial BM efficiency and initial cost-leadership strategy, shall also lead to an increase in the combination variables of initial BM novelty and cost-leadership strategy. Second between, ”Initial BM Efficiency * Initial Differentiation,” and ”Initial BM Novelty * Initial Differentiation” (0.426) which indicates, that an increase in the combination variable of initial BM efficiency and initial differentiation strategy, shall also lead to an increase in the combination variables of initial BM novelty and differentiation strategy. It is interesting to see that in the combination of these interaction variables, both the initial business models have a strong and positive correlation with the same strategy in each case, implying or hinting towards Business Model Ambidexterity in combination with the particular strategy. Lastly, all the correlations observed at a 99% confidence interval are positive and moderate in strength. The correlation analysis thereby concludes that, following the proposed hypotheses, there exists significant evidence backing a positive correlation, particularly between Initial BM innovation and Initial cost-leadership strategy. This correlation suggests support for the alternative hypothesis, H5a, stating ”Interaction between novelty-centered business model design and cost-leadership strategy is positively associated with the growth in the number of FTE”, may be accepted. As correlation does not determine causality, next, regression analysis is conducted to validate this effect.

	Description	1	2	3	4	5	6	7	8	9	10	11	12
1	Growth in FTE	1											
2	Change in Revenue	-0.005	1										
3	Firm Age	0.235	0.105	1									
4	Industry	-0.054	0.005	-0.167	1								
5	Increase in Business Model Novelty	-0.031	0.073	0.227	-0.208	1							
6	Increase in Business Model Efficiency	-0.161	-0.033	0.024	0.013	0.218	1						
7	Increase in Cost-Leadership Strategy	-0.041	0.221	0.039	0.210	0.156	0.333*	1					
8	Increase in Differentiation Strategy	0.130	0.045	-0.059	0.238	0.050	0.267	0.397**	1				
9	Initial Business Model Novelty * Initial Cost-leadership Strategy	0.315*	-0.178	-0.320*	0.097	-0.179	-0.160	-0.058	0.441**	1			
10	Initial Business Model Novelty * Initial Differentiation Strategy	0.025	0.085	-0.253	-0.083	-0.127	0.178	0.153	0.027	0.084	1		
11	Initial Business Model Efficiency * Initial Cost-Leadership Strategy	0.117	-0.275	0.069	0.075	-0.042	-0.008	-0.061	0.332*	0.384**	-0.078	1	
12	Initial Business Model Efficiency * Initial Differentiation Strategy	0.006	-0.154	-0.097	0.007	-0.001	0.181	-0.033	-0.137	-0.071	0.426**	0.124	1
	* : Correlation is significant at the 0.05 level (2-tailed). ** : Correlation is significant at the 0.01 level (2-tailed). N = 49												

Table 5.6: Correlation Table

5.6. Regression Analysis

Upon performing the correlation analysis and finding correlations between the variables, regression analysis is performed to predict the relationship between the dependent and independent variables. To analyze the data, multiple-hierarchical regression analysis was performed, as it examines the amount of variance in a dependent variable that may be explained by more than one independent variable. The regression analysis was performed in SPSS using the ”Enter” or the pre-set mode. Appropriate data organization was done before conducting the regression analysis. Each independent variable was analyzed with each of the dependent variables, Growth in FTE and Change in Revenue, individually. Thus measuring both, the direct and interaction effects between the variables. This analysis is conducted to predict the value of the dependent variable for each of the independent variables and test the hypotheses to see if either of the business models or competitive strategies or their combinations have a positive influence on the firm performance.

When performing the regression analysis, the control variables were entered into the first block, followed by the direct effect independent variables in the second block, and the interaction effect variables in the third block. After performing the regression analysis, the results were tabulated for each dependent variable, as demonstrated by tables 5.7 and 5.8. Three models resulted in the outcome of the regression analysis. Model 1, depicts the first block of control variables. Model 2 depicts the regression output, including the second block consisting of the direct effect variables. Lastly, Model 3 gives the output, including all the interaction effect variables. The regression analysis table provides the values of t Stat and p-value from the Coefficients table of the regression output. While R-square and Adjusted R-square values are from the Model Summary table. The most important outputs of the regression analysis are the ”t stat” and ”p-value” columns. The t-stat value is used to measure if the coefficient is statistically significant and, together with the p-value, tests the null hypothesis of the coefficient to see if the independent variable has an impact on the dependent variable, to accept or reject the null hypothesis. A low p-value, which is less than 0.05, is considered statistically significant, indicating that the independent variable brings a change in the dependent variable, and subsequently implying to reject the null hypothesis and accept the alternate hypothesis. The output variable R-square measures the variance in the dependent variable that can be explained by the independent variable and a higher R-square value implies that the model accounts for a larger proportion of variability in the dependent variable. Consequently, the Adjusted R-square term is a modified version of the R-square that takes into account the number of predictors in the model when a different sample from the same population is considered, and similar to the R-square, a higher adjusted R-square value is preferred when comparing models with multiple predictors.

These values were calculated for all independent variables with respect to each dependent variable, as shown in the tables 5.7 and 5.8. The analysis reveals that the dependent variable, Growth in FTE, exhibits only one variable, an interaction term between business model novelty and cost-leadership strategy, with a significant p-value of less than 0.05. The remaining variables had much higher p-value, ”Increase in Business Model Novelty” with 0.686, ”Increase in Business Model Efficiency” with 0.215, ”Increase in Cost-leadership strategy” with 0.736 ”Increase in Differentiation strategy” with 0.145, ”Initial BM Novelty * Initial Differentiation” with 0.650, ”Initial BM Efficiency * Initial Cost-leadership” with 0.469, and ”Initial BM Efficiency * Initial Differentiation” with 0.589. This result indicates that there is no significant relationship in the regression models, Model 1 and Model 2. Only the variable, ”Initial BM Novelty * Initial Cost-leadership” demonstrated a significant p-value of 0.020, which is less than 0.05, indicat-

ing statistical significance and implying that this combination of initial business model novelty and initial cost-leadership strategy has an impact on the firm performance metric, growth in the number of FTE. This impact is highlighted further by a relatively high t-statistic of 2.419, indicating its statistical significance. With a significant p-value obtained from regression analysis, this study reinforces the insights garnered from correlational analysis. It suggests the acceptance of the alternative hypothesis, H5a- Interaction between novelty-centered business model design and cost-leadership strategy is positively associated with the growth in the number of FTE- signifying a tangible relationship between the variables examined. The other variables did not show any statistical significance with the dependent variable, Growth in FTE, indicating no impact caused on the dependent variable by these variables. Further, it is also important to note the R-square value of the interaction term of initial BM novelty and initial cost-leadership strategy to gauge the variance in the dependent variable that can be explained by this model. The R-square value is 0.264, indicating that this model (Model 3) can explain 26.4% of the variability in the dependent variable caused by the independent variable.

	Model 1		Model 2		Model 3	
	t	**Sig.**	**t**	**Sig.**	**t**	**Sig.**
Dependent Variable: Growth in FTE (Constant)						
Control Variable						
Firm Age	1.597	0.117	1.736	0.090	2.655	0.012
Industry	-0.107	0.916	-0.430	0.669	-0.079	0.938
Independent Variables						
Increase in Business Model Novelty			-0.408	0.686	-0.055	0.956
Increase in Business Model Efficiency			-1.259	0.215	-0.736	0.467
Increase in Cost-Leadership Strategy			-0.339	0.736	-0.521	0.606
Increase in Differentiation Strategy			1.483	0.145	0.411	0.684
Initial BM Novelty * Initial Cost-Leadership Strategy					2.419	**0.020***
Initial BM Novelty * Initial Differentiation Strategy					0.458	0.650
Initial BM Efficiency * Initial Cost-Leadership Strategy					-0.731	0.469
Initial BM Efficiency * Initial Differentiation Strategy					0.545	0.589
R-square	0.055		0.132		0.264	
Adjusted R-square	0.014		0.008		0.070	
N	49		49		49	
* : 95% Confidence (α) ** : 99% Confidence (α)						

Table 5.7: Regression Analysis with Growth in FTE as dependent variable

Consequently, for the second dependent variable, Change in Revenue, similar steps to the first regression analysis were performed, keeping every input the same, except for the dependent variable, which was changed to ”Change in Revenue”. Again same as before, control variables were entered into the first block, followed by direct effect variables, followed by the interaction effect variables. However, unlike the regression analysis with the Growth in FTE as the dependent variable, the regression analysis with change in revenue, resulted in high p-values (more than 0.05); p-values: ”Increase in Business Model Novelty” with 0.826, ”Increase in Business Model Efficiency” with 0.442, ”Increase in Cost-leadership strategy” with 0.127, ”Increase in Differentiation strategy” with 0.914, ”Initial BM Novelty * Initial Cost-leadership” with 0.322, ”Initial BM Novelty * Initial Differentiation” with 0.327, ”Initial BM Efficiency * Ini-

tial Cost-leadership" with 0.222, and "Initial BM Efficiency * Initial Differentiation" with 0.402. None of the direct and interaction variables demonstrated statistical significance, indicating that, within these three models none of the variables of this study have a significant impact on the dependent variable, change in revenue. Thus the overall regression analysis concludes by emphasizing the vital significance of only the interaction variable "Initial BM Novelty * Cost-Leadership Strategy" in predicting the impact on "Growth in FTE."

	Model 1		Model 2		Model 3	
	t	**Sig.**	**t**	**Sig.**	**t**	**Sig.**
Dependent Variable: Change in Revenue (Constant)						
Control Variable						
Firm Age	0.730	0.469	0.547	0.587	0.521	0.606
Industry	0.154	0.878	-0.149	0.882	0.034	0.973
Independent Variables						
Increase in Business Model Novelty			0.221	0.826	0.228	0.821
Increase in Business Model Efficiency			-0.776	0.442	-1.053	0.299
Increase in Cost-Leadership Strategy			1.557	0.127	0.997	0.325
Increase in Differentiation Strategy			-0.108	0.914	0.798	0.430
Initial BM Novelty * Initial Cost-Leadership Strategy					-1.004	0.322
Initial BM Novelty * Initial Differentiation Strategy					0.992	0.327
Initial BM Efficiency * Initial Cost-Leadership Strategy					-1.241	0.222
Initial BM Efficiency * Initial Differentiation Strategy					-0.847	0.402
R-square	0.011		0.074		0.196	
Adjusted R-square	-0.031		-0.059		-0.016	
N	49		49		49	
* : 95% Confidence (α) ** : 99% Confidence (α)						

Table 5.8: Regression Analysis with Revenue Change as dependent variable

6

Discussions

The relationship between business models (BM's), competitive strategies (CS's), and their influence on company performance is extremely important in today's dynamic and more globalized corporate world. Understanding and reacting to changing market trends and problems requires a detailed examination of how organizations structure their operations and compete in the market. Given the Netherlands rising prominence in innovation and technology, this study is especially significant considering the context of the high-tech startup. Through the process of analyzing the intricate relationship between competitive strategies and business model innovation (BMI), this chapter offers valuable insights that could potentially apply to a more global setting.

This study looks into the impact of BMI and competitive strategies on the performance of high-tech startups in the Netherlands. As supported by various authors, BMI is crucial, especially in the context of startups, as they need to adapt to the market needs with the limited resources available at their disposal. Thereby, startups that have focused on BMI have seen positive results, as shown through the example of the Ryanair case study 3.1.1. However, without proper execution of the business model, the startup might not be able to achieve the performance growth it expected from implementing the business model. Hence, an appropriate competitive strategy is required to be implemented with the business model. This research further looks into the generic strategies suggested by Porter, as they are more relevant in the context of high-tech startups. These strategies are very promising if implemented correctly and can aid the firm with a boost in performance [Porter, 1980]. The existing strategic literature frequently promotes novel business model designs as essential drivers of entrepreneurial success due to their attributes. Scholars have emphasized the relevance of innovation, but they may have overestimated its importance as the sole requisite for outstanding performance. Contradicting this popular belief, Leppänen et al. [2023] proposed a hypothesis that novelty alone does not guarantee success; rather, it thrives when combined with specific configurations of other value drivers, particularly efficiency, and incorporating strategies such as differentiation, would lead to higher performance, particularly in these new technological landscapes. Consequently, this research looks into the direct and interaction effects between the business models and competitive strategies on startup performance to better understand if the existing literature on BMI has an impact on Dutch startup performance and how strategy plays a role alongside BMI to influence performance.

6.1. Framework and Guidelines

A framework, see figure 3.2, was created to formulate hypotheses to confirm the effects of business model innovation and business strategy on firm performance. This conceptual model helps identify the relationships being studied in this research. Consequently, keeping the research objective in mind, 16 hypotheses were formulated, i.e., eight hypotheses for each dependent variable of firm performance, Growth in FTE (Full Time Equivalent Employees), and Change in Revenue. With the support from the literature showing the positive influence of BM and CS used in this research, all the hypotheses were formulated expecting a positive outlook on the firm performance for both the dependent variables, Growth in FTE and Change in Revenue. Zott and Amit [2008], in their research on measuring the influence (both direct and interaction) of business models and product market strategies on the firm performance of established firms, indicated that BM and CS have a positive influence on the firm performance. Zott and Amit [2008] found that novelty-centered business models and different competitive strategies displayed positive relationships in the context of BM, CS, and firm performance. This implies that businesses may successfully integrate strategies and business models, even the ones that at first glance might appear contradictory, for instance, the positive impact of BM novelty and Cost-leadership strategy on firm performance. Additionally, the authors pointed out that BM and CS should be used in combination rather than as substitutes for each other. However, their research, too, could not prove a relationship between an efficiency-centered BM and CS, cost leadership, and differentiation. Similar instances with various other authors also took place, where they did not find positive relations between BM and CS on firm performance. For example, Hu and Chen [2016] found only a positive relation of increase in BM efficiency on firm performance and not for BM novelty when researched on Chinese manufacturing firms. Similarly, Balboni et al. [2019], when researching Italian high-tech startups, found a positive relation to the growth when the startups increased traits from BM efficiency in their business model, as compared to BM novelty. Slavik et al. [2020] found a similar case when researching startup strategies in Bratislava, that is, only a positive relation of cost-leadership and no relationship of differentiation strategy on startup's performance. Contrasting to the research of Slavik et al. [2020], Islami et al. [2020] found a positive relation of both the strategies, cost-leadership, and differentiation, with respect to firm's performance, by examining small and medium enterprises. These existing literature studies on startups across the globe indicate the positive effects of both BM and CS. Subsequently, the theoretical framework and set hypotheses are formulated based on these existing theories, and a positive influence on the performance of Dutch high-tech startups is assumed, considering the contextual relevance of business models and strategies in increasing the firm performance, thereby enhancing the internal validity of the research.

6.1.1. Ethical Considerations

After formulating and checking these hypotheses, data was collected from high-tech startups in the Netherlands using a survey questionnaire. Further, as this research looks at the business models and strategies and their effect on firm performance, research of Balboni et al. [2019] and Zott and Amit [2008] was followed, as their research looks at the similar independent and dependent variables but in a different setting (firms size, year of establishment, geographic demographic, etc.). A survey questionnaire designed following the author's works on business models and competitive strategies ensured the validity and robustness of the constructs being measured. The survey comprised 38 questions in total, to which the participants provided responses. The high-tech firms that were founded in the Netherlands between 2017 and 2020

constitute the study's participants. This specific time-frame's incorporation of startups enables a glimpse of the more current and emerging trends in the high-tech industry. Subsequently, during the data collection phase, the entire research was guided by the General Data Protection Regulation (GDPR) and other ethical considerations involved when dealing with human participants. Following the set guidelines, this study safeguards the rights of each participant involved by ensuring anonymity and confidentiality and by obtaining informed consent from the participants. Lastly, this report is also embargoed for a set duration to protect participant's identity exposure. The emphasis on these ethical concerns was intended to maintain this study's validity and scientific integrity. Respondents participated voluntarily, and they were fully informed about the research, including its risks and benefits. It was also made clear that withdrawal from the research was permitted at any time and without consequences. To protect participants' names and personal information, anonymity and confidentiality were maintained. These principles were consistent with research standards for developing confidence and reliability in the research findings.

6.2. Findings

6.2.1. Sample Data Analysis

These startups were chosen using an appropriate blend of convenience and selective sampling techniques. Convenience sampling was used to discover and engage participants who were easily reachable (that is easier to contact), which is frequently an effective approach when collaborating with startups. Purposive sampling was also important in the selection process, allowing for the intentional inclusion of companies that fulfilled the exact criteria indicated in the research scope. This technique improves the internal validity of the study by ensuring that the sample includes startups that are highly relevant to the research, hence addressing the relevant segment of the general population. A time-frame of four to six weeks was deemed adequate in this study's scope for data collection, considering the responses received. During this period, 56 strong and thorough replies were collected, highlighting the high participation rate. Further avoiding any procedural bias, the research was conducted under the guided supervision of subject-matter experts and adhered to a set research methodology and analysis process. Next, after the data collecting stage, the data was meticulously tabulated, arranged, and assigned the appropriate values using the Excel tool. The creation of an organized and well-configured data set for insightful statistical analysis required these pre-analysis data preparation steps. In addition, several variables were calculated that would provide the basis for the study's analysis of the independent and dependent variables. This initial stage of preparation made sure the data was ready for an in-depth statistical analysis to answer the hypotheses and provide insights into the Dutch startup ecosystem.

A total of 56 responses were received (response rate of 27.45%) from Dutch high-tech startups. Of these, only 49 responses were considered valid, as they fit the primary scope of the research, i.e., dutch high-tech startups established between 2017 and 2020 and belonging to the high-tech domain. This time-frame was considered appropriate to observe the emerging successful trends in the Dutch startup ecosystem, as most startups are likely to close operations within the first eighteen months [Behnke and Kibbel, 2017]. Further, only the founding members or team members with relevant knowledge were provided with the survey to ensure data validity and credibility. From the responses collected, it was observed that the majority of the high-tech startups participating in the survey were from the Technology and IT Services industry (38.78%). The second industry runner in the number of responses received was the

manufacturing and engineering industry, providing 24.49% responses of the total responses received. Due to the competitiveness of these industries in the Dutch market, receiving higher responses from startups belonging to these industries facilitated a more comprehensive data analysis. This spectrum of responses enhances the study's findings, resulting in a more complete knowledge of the links between BM's, CS, and firm performance among Dutch high-tech startups. Consequently, as seen in table 4.1, an almost equal number of responses were received for each year (from 2017 to 2020), which indicated that the initial firm size of 95.92% of the startups was less than 8 full-time employees. This data is as expected, as generally, for a new venture, it is unlikely to have a very high number of full-time employees, as startups initially have a scarcity of resources. These percentages show a major shift when the startup's current firm size was observed. Most of the startups demonstrate growth in firm size, i.e., having more than 8 full-time employees, with a few having more than 50 full-time employees. This increase in FTEs indicates positively with respect to the startup's developmental growth, demonstrating the startup's high operationality and need for talent in its growth phase.

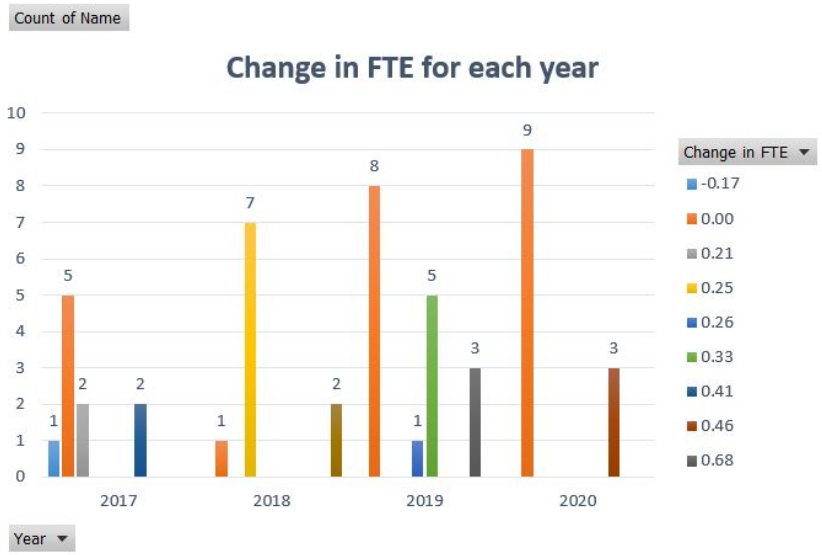

Figure 6.1: Change in FTE

The figures 6.1 and 6.2 show the change in FTE and Revenue for startups from each year. The "Change in FTE" values in the figure 6.1 shows the growth in FTE (which is calculated by taking the cumulative average growth to determine the yearly growth of the startups). The first two values, -0.17 and 0.00, indicate negative and zero growth in FTE for that number of startups from that year. This figure also shows that three startups of the year 2019 showcased the highest positive change in FTE (0.68). Figure 6.2 demonstrates the percentage change in the startup revenue since its foundation for startups of each year. Contrasting to the other metric of firm performance, Growth in FTE, startups founded in 2019 exhibited the highest number of startups not experiencing revenue. Despite this, five of the startups established in the year 2019 showcased a revenue growth of more than 100%, and at least one startup from each year demonstrated a revenue change of more than 100%. The observed changes in performance metrics suggest that the majority of startups underwent some level of transformation. However, it's noteworthy that a subset of startups did not witness any growth in terms of FTE and Revenue.

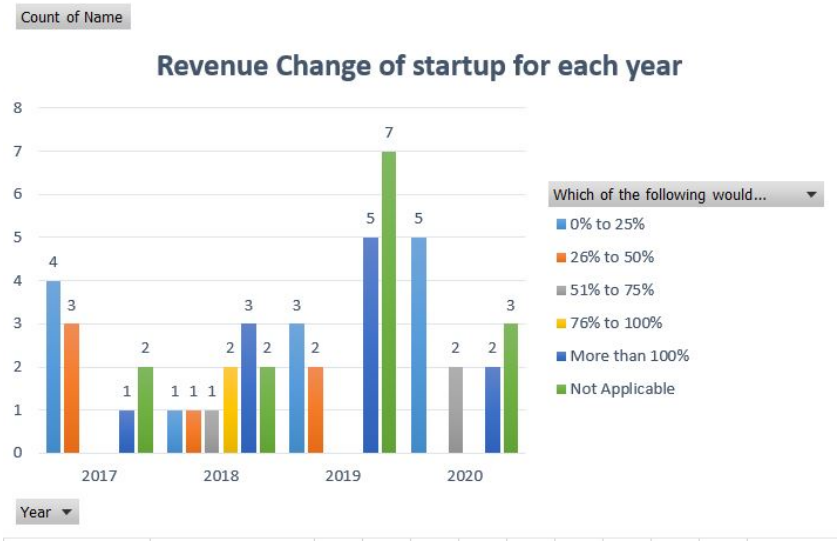

Figure 6.2: Change in Revenue

The research was then checked for biases commonly occurring while conducting quantitative research to ensure reliability and validity. Selection bias, common-method bias, were checked (see section 4.1.3). The research followed relevant procedures to mitigate these common biases by conducting appropriate tests to check if the data is indicative of any bias. Next EFA (Exploratory Factor Analysis) was performed to identify the factor scores for each construct before operationalizing it for further analysis. Factor loadings for each construct were obtained as depicted in table 5.1, and the factor scores were also generated. These values indicated that all the items loaded onto each respective construct. Further, the research design was also checked with existing literature Balboni et al. [2019] and Zott and Amit [2008] to ensure its credibility. Reliability analysis was performed by measuring the Cornbach's alpha for each of the independent variables. Although the reliability scores were not very high for all of the variables, they are considered reliable. As explained by Charter [2003] and Puelz and Sobol [1995], this low reliability could be due to the small sample size, as a small sample size when used in internal consistency studies may not be sufficient for establishing accurate reliability coefficients. Additionally, probable inadequacies present in the survey questions could also lead to lower reliability scores, and having to enhance the questionnaire by adding more questions or tailoring them for each variable might help mitigate these limitations. Next, multicollinearity was checked between the variables of the study to see if two or more independent variables in the study showed a high correlation with one another. The VIF and tolerance scores of the independent variables were less than 10 (for VIF) and above 0.2 (for Tolerance). This indicated that there is no multi-collinearity between the variables, boosting the study's reliability.

6.2.2. Descriptive Analysis

After checking the reliability and validity, statistical analysis was performed on the collected data. Descriptive statistics provided an overview of the sample's central tendency and variances. Table 5.4 demonstrated the average annual growth rate of 0.20, or 20%, in terms of full-time equivalent employees for the Dutch high-tech startups involved in the study. This implies that startups, on average, have been growing by approximately 20% in terms of FTE or

organizational growth. The standard deviation value (0.24) indicated that a few startups might not have grown in size (which is also depicted in the figure 6.1). Similar insights can be drawn for the Change in Revenue variable, showing a mean of 40.67%, implying that startups of the study have, on average, grown in revenue by approximately 40.67%. However, the standard deviation value of 44.78 suggests that some startups reported zero revenue, as illustrated in Figure 6.2. This variability in revenue growth across startups in the Netherlands highlights the diversity of experiences, with firms demonstrating the ability to sustain themselves over an extended period by effectively leveraging their resources. This observation implies that startups may have implemented competitive business models and strategies, enabling them to endure despite facing challenges in revenue generation. Despite these variations, on average, there is a noticeable growth in terms of both performance metrics, including the number of employees and revenue.

This high standard deviation, also evident from the normal distribution plots, suggested the possible categorization to represent the data better (see figure 5.3, and 5.4). These variables were then categorized before proceeding for further analysis. The central tendencies, variances, and skewness with the normal distribution plots were computed. The ”Mean” column in descriptive statistics points to neither of the business models or strategies being heavily preferred (Mean = 0) by Dutch high-tech startups. This value, accompanied by the standard deviation values, indicates that there is a slight variation in the mean, implying startups do not rely on a specific strategy or business model alone, however, this was not the case when the BM's and CS were used in combination. From the descriptive analysis conducted, table 5.4, it is observed that the companies favored the cost-leadership strategy in combination with both of the business models over the differentiation strategy in the founding years to stay competitive. This indicates that most start-ups did not aggressively pursue a differentiation strategy as part of their strategic approach and focused on reducing costs. This is, however, contrasting as startups generally target niche markets and first aim at developing niche and highly valued products and services, yet, understandably, staying in the differentiation strategy would require heavy initial resources, which the startup might not have at its disposal.

The mean change in the combinations of both BM's with differentiation strategy was lower, indicating a change in the startup strategy from developing distinctive and expensive goods and services for a unique set of customers to standardizing these products and services to offer them at low cost. Thus, the overall shift towards an optimal use of available resources approach undertaken by startups is well indicative of startups' readiness to enter their products and services into the market, as both these BM and CS aim to create a standardized process and overall efficiency at lower costs, and thus making it beneficial for the startup to employ this BM and CS in conjunction. The more interesting and rather unconventional approach, which startups also prefer, is the combination of BM novelty and cost-leadership strategy. This implies that startups look to incorporate novel practices in their business model to sell their products and services at a lower cost. As depicted by Zott and Amit [2008], this combination of novelty and low-cost does have a positive influence on the firm performance, making it a viable choice for startups, as this fits the startup's basic characteristics of utilizing limited resources in an innovative manner to provide, generate, and deliver value, and at the same time also stay competitive. Further, the skewness of all the variables (see tables, 5.4 and 5.5) demonstrated that the skewness of most of the variables is between the range of -0.5 to 0.5, with a few between 0.5 to 0.8 (moderate skewness), proposing the data is normally distributed and statistical analysis can be performed.

6.2.3. Correlation Analysis

This statistic provided an outline for understanding startup growth trends and strategic decisions. The evaluation of changes in business model novelty, efficiency, differentiation strategy, and cost-leadership strategy shed more light on the strategic preferences of Dutch high-tech companies. Subsequently, correlation analysis was performed to check for correlations primarily between the dependent and independent variables. The correlation table 5.6 depicts correlations at both 95% and 99% confidence intervals. The bivariate correlation analysis revealed only one significant relation at a 95% confidence interval between the combination of business model novelty and cost-leadership strategy with the startup performance. The remaining variables did not present any significant correlation with the dependent variables, and their observed correlations were also notably low, implying there might be no meaningful relationship between the two variables. This correlation analysis aligns with the descriptive statistics results, indicating the startup's preference for combining business model novelty and cost-leadership strategy.

The correlation analysis (see table 5.6) depicted a moderate and positive correlation of 0.315 at a 95% confidence interval between the interaction variable of initial BM novelty and initial cost-leadership strategy and growth in FTE. This moderate correlation could be possible because of the small sample size, as the data demonstrated slight variance about the mean, and a larger sample across the Dutch startup landscape would result in a more reliable correlation value. The other direct and interaction variables presented low (and a few negative) correlation coefficients with both the dependent variables, growth in FTE and change in revenue, implying these variables might not influence the Dutch startup's growth. Other significant correlations at 95% confidence interval- between the variables Firm Age and the interaction variable, Initial Business Model Novelty * Initial Cost-leadership Strategy (-0.320), and between the increase in BM efficiency and increase in cost-leadership strategy (0.333)- indicate that as a firm grows older, it does not tend to prefer the combination of business model novelty and cost-leadership strategy and this approach moderately tends to decline with time. This further implies that Dutch high-tech startups might initially favor low-cost and novel approaches, but as the startup grows, they tend to avoid this combination. This is in contrast to the other interaction term between BM efficiency and cost-leadership strategy, which tends to increase moderately as the firm age increases, implying Dutch high-tech startups, with time, prefer or adopt the combination of BM efficiency and cost-leadership strategy to stay competitive. Subsequently, the correlation between BM efficiency and cost-leadership strategy was expected due to their innate characteristics and existing literature, implying managers and entrepreneurs understand the similarities in their characteristics and see potential benefits in implementing this combination in favor of the other combinations of BM and CS (correlation = 0.069), over time. While at a 99% confidence interval, only one notable, positive, and significant correlation was observed between two interaction terms, a combination of BM novelty and cost-leadership strategy and a combination of BM efficiency and cost-leadership strategy (0.384). As highlighted in strategic literature, firms sometimes consider BM novelty and efficiency as not mutually exclusive and use them in combination by creating a balance between the levels of novelty and efficiency. This approach is termed business model ambidexterity (BMA), which could be beneficial for startups to adjust their market plan based on the market requirements and ongoing trends and heading toward growth. Despite not being considered highly reliable, the remaining significant correlations involve the combination of both strategy choices (cost-leadership and differentiation), implying the firms might be "Stuck in the Middle" and could be in the phase of selecting the appropriate market strategy. However, it's advisable for firms to exercise caution and not prolong this phase, as it could potentially impede

long-term growth [Porter, 1985]. Thus, operating without a defined strategic direction can result in inefficient resource allocation, missing opportunities for market differentiation, and a higher vulnerability to competition threats. Furthermore, it may cause a loss of concentration and dilute organizational efforts, preventing the building of a resilient competitive edge. Thus, when startups are in this phase, they should emphasize addressing this strategic ambiguity in a timely and decisive manner to ensure a stronger and more adaptive trajectory toward long-term growth and productivity.

6.2.4. Regression Analysis

Ensuring the measurement of correlations between the variables, this research also aims to confirm and extend the research by Zott and Amit [2008] and Balboni et al. [2019] by measuring the impact of BM and CS on the firm performance by performing regression analysis. Multiple-hierarchical regression analysis was performed for all eight variables, four direct and four interaction variables, to measure their impact on the dependent variables, Growth in FTE, and Change in Revenue to help answer the stated hypotheses. When using multiple-hierarchical regression, first, the control variables were entered in the first block, followed by the direct effect variables in the next block. Lastly, the interaction effect variables in the third block and the regression outputs were displayed, as shown in tables 5.7 and 5.8. The regression output were quite surprising, and differing from the results of few authors. First, when considering the relationship with respect to the dependent variable, Growth in FTE, only the interaction effect between initial business model novelty and initial cost-leadership strategy showed a significant relationship with the dependent variable; this was given by the p-value being less than 0.05. This regression output thereby approves the alternate hypothesis, *H5a*, ”Interaction between novelty-centered business model design and cost-leadership strategy is positively associated with the growth in the number of FTE.” The other seven variables presented non-significant p-values, indicating they do not significantly impact the increase in the number of FTE’s at a Dutch high-tech startup. Overall, the regression analysis for the dependent variable, Growth in FTE, accepts only the hypothesis ”H5a” and rejects all the remaining seven hypotheses- H1a, H2a, H3a, H4a, H6a, H7a, and H8a- implying that in the Dutch startup landscape, high-tech startups prefer the combination of business models and strategies to achieve their growth objectives. As a result, entrepreneurs want to apply their business model or strategy in complementation rather than isolation in order to keep their competitive edge.

Similar results were obtained when considering the regression output for the second dependent variable, the change in revenue. However, unlike the variable, Growth in FTE, change in revenue did not show any significant relationship between the independent variables (direct and interaction) and the dependent variable. All the independent variables demonstrated a p-value higher than 0.05, and t-statistics were also quite small, implying that these variables, in turn, do not influence the startup’s revenue. Advancing with these results, this research concludes that none of the eight hypotheses formulated- H1b, H2b, H3b, H4b, H5b, H6b, H7b, and H8b- for measuring the effect on revenue were accepted. For all these eight variables, the null hypotheses were accepted, indicating there is no difference or no change in the effect of these variables on the dependent variable. The findings of this study diverge from established research, including works by various authors such as- Gerdoçi et al. [2018], Balboni et al. [2019], Hu and Chen [2016], Islami et al. [2020], Slavik et al. [2020], Lechner and Gudmundsson [2014], and Zott and Amit [2008]. These existing body of research emphasizes the significance of BM novelty, BM efficiency, and both the strategies and interaction effect variables in influencing firm performance in terms of growth in the number of employees and

revenue. Despite these significant results, some researchers- including Balboni et al. [2019], Hu and Chen [2016], IJntema et al. [2022], Kharub et al. [2017], and Block et al. [2015]- have reported findings consistent with our study, specifically regarding direct effect variables such as BM novelty, BM efficiency, Cost-leadership strategy, and Differentiation strategy. However, limited research, particularly on the interaction effect, as noted by Zott and Amit [2008], exists when considering the combined influence of business models and business strategies on employee growth.

The results of this study are, however, different from the ones obtained by Zott and Amit [2008], who studied the interaction effects between the BM and CS on firm performance and found a positive interaction effect only between novelty-centered business model and differentiation strategy. As their results were based on established firms from Europe and the United States (of firms established between 1996 and 2000), the result of this research could imply that with the times and trends changing, new ventures adopt a unique and low-cost approach to sustain in the competitive market space. Hence, considering the interaction term ”Initial BM Novelty * Initial Cost-Leadership strategy” stood out with a notable result of a significant p-value of 0.020, which is less than the conventional significance level of 0.05, suggesting that this specific variable possesses the capacity to predict changes in the dependent variable, Growth in FTE. The robustness of this relationship is further emphasized by a moderately high t-statistic value of 2.419. It implies that the specific combinations of initial business model novelty and initial cost leadership can predict a significant effect on the growth of FTE within Dutch high-tech startups.

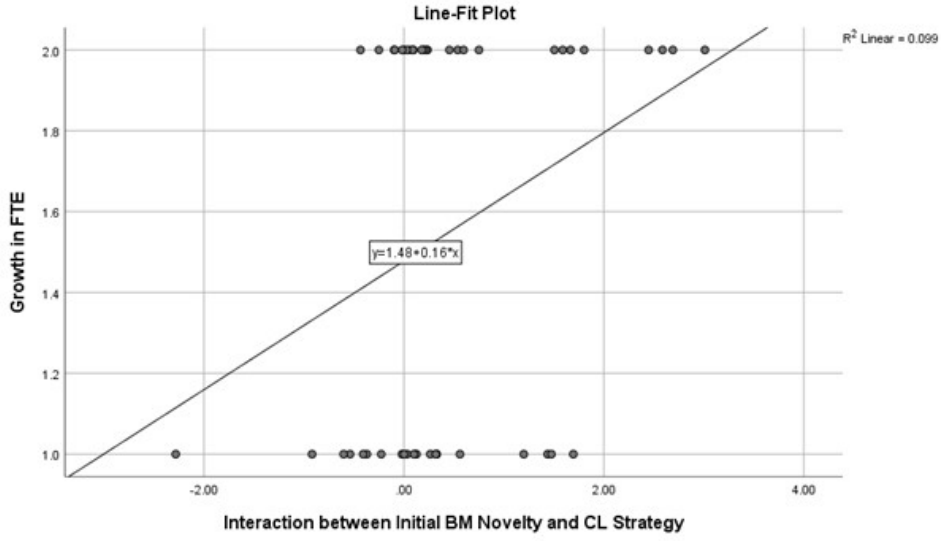

Figure 6.3: Line-Fit Plot: Growth in FTE variable

The regression table 5.7 and the plots (see figures 6.3 and 6.4) depict that the combination of initial BM novelty and initial cost leadership strategy, when checked on the growth in the number of FTE, demonstrates a positive and linear relationship. The line fit plot, see figure 6.3, shows that there is a positive relationship between the two variables, meaning that Dutch high-tech startups with both higher initial BM novelty and an initial concentration on cost leadership are likely to see faster growth in their FTE’s. Figure 6.3 depicts the line equation between the two variables, ”y = 1.48 + 0.16x”, indicating that there is a weak and positive relation between the independent and dependent variable, and as the combination of novelty and

cost-leadership increases, the growth in the number of FTE also tends to increase. The R-square value of 0.264 also supports this argument by indicating that the independent variable only accounts for approximately 26.4% of the variance caused by the dependent variable; hence, the positive yet weak relationship. Further, the slope of the line of best fit is 0.16, which suggests that for every one-unit increase in the combination of BM novelty and cost-leadership strategy, the number of employees should rise by 0.16 units. The line's y-intercept is 1.48, reflecting that the growth in FTE variable predicts a value of 1.48 when the interaction variable between novelty and cost-leadership is kept constant. This line-fit plot further depicts the points to be at two levels, which is due to the categorized data variable, and the plot before this categorization would be different (see appendix A.16). The residual plot, see figure 6.4, also shows a random distribution of residuals around zero, with no clear pattern, indicating that the regression model is a good fit for the data and there is no evidence of heteroscedasticity or (major) outliers. These residual plots suggest that the regression model between initial BM novelty and initial cost leadership strategy can explain the variation in the growth of FTE, well for the given sample data.

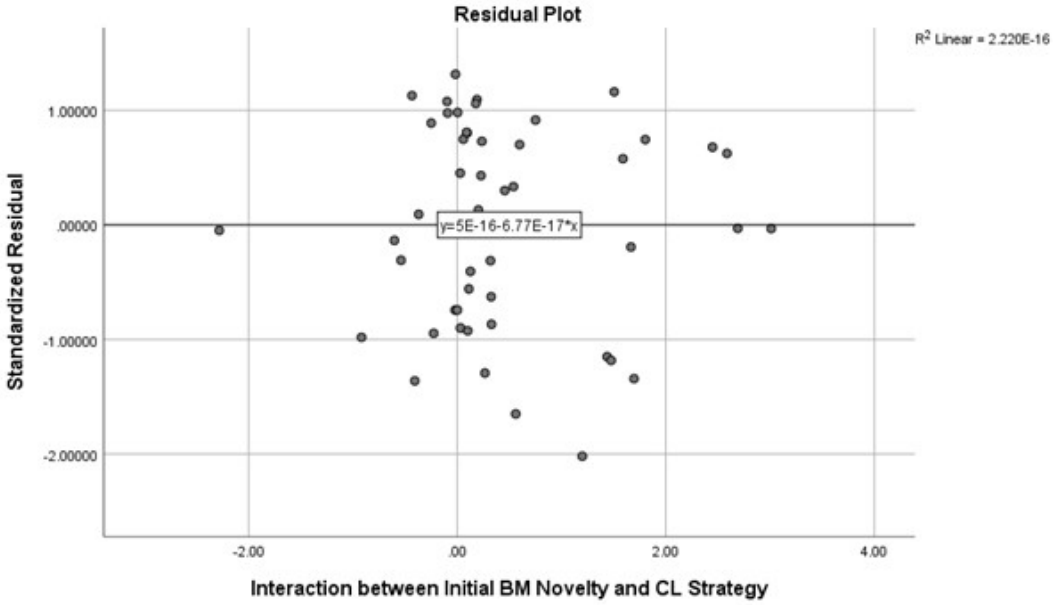

Figure 6.4: Residual Plot: Growth in FTE variable

Moreover, as these startups are better positioned to attract new customers and expand their market reach due to their innovative and competitive nature, implying to meet the fast expansion, it may be necessary for startups to hire additional full-time employees. A greater team can successfully serve the demands of an expanding client base and a broader market presence, allowing the firm to continue its growth trajectory. Another reason to explain this influence on growth in FTE is taking into consideration the dynamic nature and flat structure while working in a startup, which might be preferable for many employees, as the employees look to be part of businesses that are at the forefront of industry advancements. Additionally, to this positive relationship, it is essential to recognize that BM novelty and cost-leadership strategy are not the only or sole elements driving the boost in FTE for Dutch high-tech startups. The target market-size, the expertise of the management team, and the availability of capital are other important variables that significantly influence how quickly these firms expand in terms of their employees. Although these factors were not part of this research, future re-

search can be done to study the effect of these factors on firm performance. Consequently, figure 6.5 indicates the hypotheses table for the variable Growth in FTE, and its significance for the Dutch high-tech startups. This choice is similar to the choice adopted by Ryanair for BMI (see section 3.1.1, implying startups aim to create a disruptive business model to grow and achieve competitive advantage.

Hypothesis	Result	Significance
H1a: Increase in efficiency-centered business model design is positively associated with the growth in the number of FTE	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups Increase in BM efficiency does not significantly contribute to the Growth in FTE
H2a: Increase in novelty-centered business model design is positively associated with the growth in the number of FTE	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups Increase in BM Novelty does not significantly contribute to the Growth in FTE
H3a: Increase in cost-leadership strategy is positively associated with the growth in the number of FTE	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups Increase in Cost-Leadership Strategy does not significantly contribute to the Growth in FTE
H4a: Increase in differentiation strategy is positively associated with the growth in the number of FTE	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups Increase in Differentiation Strategy does not significantly contribute to the Growth in FTE
H5a: Increase between novelty-centered business model design and cost-leadership strategy is positively associated with the growth in the number of FTE	**p < 0.05; Alternate Hypothesis Accepted**	For Dutch high-tech startups the combination between BM novlety and cost-leadership strategy **does significantly contribute** to the Growth in FTE
H6a: Interaction between efficiency-centered business model design and cost-leadership strategy is positively associated with the growth in the number of FTE	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups the combination between BM efficiency and cost-leadership strategy does significantly contribute to the Growth in FTE
H7a: Interaction between novelty-centered business model design and differentiation strategy is positively associated with the growth in the number of FTE	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups the combination between BM novlety and differentiation strategy does significantly contribute to the Growth in FTE
H8a: Interaction between efficiency-centered business model design and differentiation strategy is positively associated with the growth in the number of FTE	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups the combination between BM efficiency and differentiation strategy does significantly contribute to the Growth in FTE

Figure 6.5: Hypotheses Table: Growth in FTE

On the other hand, the regression analysis of the independent variables with the second dependent variable, Change in Revenue, did not reveal any significant relationships (see table 5.8). This implies that all the eight formulated hypotheses considering the dependent variable (H1b to H8b) are rejected, and null hypotheses are accepted with respect to each of the eight hypotheses. As a result, the results of the regression analysis with ”Change in Revenue” as the dependent variable indicate that, in the context of Dutch high-tech startups, an increase in business model design, whether novelty-centered or efficiency-centered, proves to have no discernible impact on revenue growth. Similarly, whether the companies pursue a cost-leadership or differentiation strategy, the revenue remains unaffected. This finding implies that revenue increases for Dutch high-tech startups may be influenced by variables other than business models and strategy. The lack of significance in these hypotheses suggests that, in the dynamic environment of Dutch high-tech startups, changes in revenue are not substantially correlated with the strategic decisions. This suggests that firms may have some flexibility in developing their strategies without experiencing an immediate or tangible impact on its revenue. Even though these findings seem to question the direct impact of business models and strategies on revenue growth, it is important to understand that revenue is not the

only factor determining a company's performance. A multitude of complex factors, including competition, market volatility, innovation, and technological advancements, characterize the startup ecosystem, and these may collectively impact the startup's performance in diverse ways. Figure A.15 indicates the hypotheses table for the variable Change in Revenue and its significance for the Dutch high-tech startups.

The complete assessment of these results emphasizes the complexities present in the Dutch startup environment. The anticipated direct correlations between the investigated parameters and the increase in FTEs and revenue did not materialize despite prior projections and using a rigorous analysis procedure. Hence, various factors, such as contextual effects and dynamic situational components, may contribute to and affect the complex startup ecosystem. Along with these compounding factors, the research's generalizability could be constrained by the small sample size (as other researchers performing similar studies had a sample size of at least 100- Zott and Amit [2008]; Balboni et al. [2019]), the time-frame of the startup's establishment and the unique environment of the Netherlands. External and global factors can also affect the firm performance; for instance, the worldwide lockdown brought on by the COVID-19 pandemic affected startup performance as well; during the lockdown, the majority of activities were shut down, which had an effect on revenue and firm size growth. These insights open the door to further investigation and examination of other factors that may play a critical role in understanding and improving the success of Dutch high-tech startups.

In conclusion, out of the total 16 hypotheses tested, only one, specifically *"H5a: Interaction between novelty-centered business model design and cost-leadership strategy is positively associated with the growth in the number of FTE"*, held true. This result provided insights for both academic and practical relevance. The academic context implies that this positive and significant relationship leads to the rejection of the null hypothesis and the acceptance of the alternate hypothesis (H5a), and the combination influences startup growth, adding to existing literature. The practical context implies that Dutch high-tech startups experience a considerable increase in terms of organizational firm performance, with the increase in the number of employees, when implemented with the combination of BM novelty and Cost-leadership strategy in the early years of startup development. These findings therefore emphasize the necessity of strategic alignment and creative methods in navigating the competitive startup ecosystem. Moving forward, further research into the complex mechanisms underlying these correlations is needed, to gain a better understanding of entrepreneurial methods and other factors influencing a company's success. This extensive research lays the groundwork for an extensive examination of the larger implications of theory and practice in the high-tech startup setting.

7

Conclusion

The growth of startups in today's highly competitive global market is both astonishing and unprecedented. The exponential growth of new businesses highlights how dynamic the entrepreneurship environment is. Startups need to make strategic decisions that are both relevant to the present market dynamics and in line with emerging patterns in order to successfully navigate the difficult terrain as competition ramps up. In light of this, managers and entrepreneurs are focusing increasingly on developing competitive strategies (CS's) and improving their business models (BM's) as essential tools for long-term success. This trend represents the realization that, to grow and stand out among the rising competition, strategic decision-making is not only favorable but has become a need for success in the growing business environment. Consequently, this study aims to provide a comprehensive examination of the high-tech startup environment in the Netherlands by diving into the complex web of business model innovation (BMI), competitive strategies, and firm performance. The purposeful concentration on high-tech companies in the Netherlands was an informed choice designed to capture the unique dynamics of the existing Dutch startup ecosystem. The research objectives extended the literature of decoding the complex interplay between business model designs, competitive strategies, and their impact on a firm's performance outcomes. Understanding how these elements work together to influence the trajectory of startup success is the main goal of this research.

To accomplish this overall goal, this research developed a key research question as well as four sub-research questions aimed at understanding the intricate links between competitive strategies, business model innovation, and the performance of Dutch high-tech startups. The following is the main research question that motivated this study: "What is the influence of competitive strategies and business model innovation on the performance of Dutch high-tech startups?" The sub-research questions aim to answer the main research question and guide the research. The first two sub-research questions delved into the influence of business models and strategies on startup performance by conducting an extensive literature study (see chapter 2). Particularly, the first sub-research question investigates the influence of business models on startup performance, while the second sub-research question investigates the influence of competitive strategies on startup performance. Drawing on the works of authors on business models and competitive strategies- On business models: Balboni et al. [2019], Gerdoçi et al. [2018], Gronum et al. [2016], Zott and Amit [2008], and on strategies: Slavik et al. [2020], Block et al. [2015], Islami et al. [2020], Verbeeten and Boons [2009]- this research

demonstrates the influence of BM and CS on startup performance. The authors, through theoretical and empirical analyses of startups in different geographical locations, have confirmed via assessing prior theories and performing analysis that business model innovation and choice of competitive strategy play a pivotal role in shaping startups' success.

Extending the theoretical context, in-depth analyses were conducted to address the third and fourth sub-research questions. The predominant competitive strategies and business model themes used by high-tech companies in the Netherlands are explicitly examined in the third sub-research question. The fourth sub-research question aimed to observe if the combination of business models and competitive strategies boosted a startup's performance. The results presented in Chapter 5 show that Dutch startups have a remarkably diverse range of business models and strategic choices. For instance, as seen in figure 7.1, in 2019 and 2020, startups in the "Manufacturing and Engineering" sector highly preferred the combination of a novel business model and a cost-leadership strategy; this was not clearly the case with the 2018 startups, and particularly for the startups established in 2017 this combination was not preferred at all (evident from the negative values in the figure). This elementary analysis was done for all eight variables; see additional figures of these industry trends in appendix A.7.1. In elucidating the adaptive nature of startups, these observations emphasize the proactive approach these new ventures take in tailoring their strategic decisions to the evolving nuances of the market. This adaptation not only demonstrates their resilience but also provides a critical insight: companies may survive beyond the traditional 18-month period, despite the lack of immediate revenue, via the prudent deployment of competitive business models and strategies. This dynamic interplay between strategic flexibility and long-term viability illustrates the strategic ability of startups to traverse barriers and capitalize on opportunities, eventually contributing to their long-term success in a competitive business landscape.

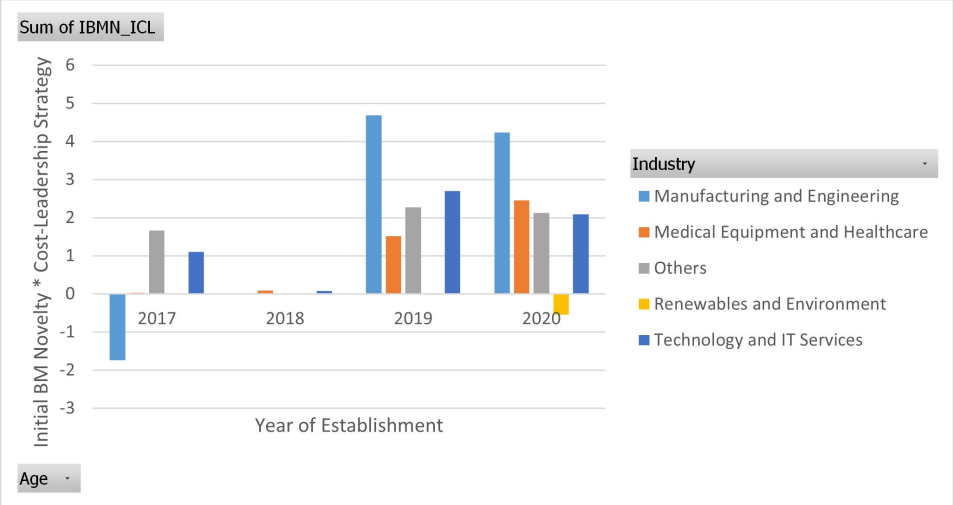

Figure 7.1: Industry Trends for each year: Initial BM Novelty * Cost-Leadership strategy

Further, this research by performing statistical analysis, aimed at answering the fourth sub-research question and eventually the main research question. The dataset, which was meticulously acquired using survey questionnaires distributed among Dutch high-tech startups, was subjected to a thorough analysis. Numerous checks were performed to identify biases and ensure the validity and reliability of the data collected, and the data was also computed and converted to the appropriate format before running the analysis. After obtaining acceptable results for every construct and variable—dependent and independent— from the

checks, the study proceeded to a comprehensive analysis stage. To extract insights from the dataset specifically, descriptive, correlation, and regression analyses were performed. The initial observations revealed a normal distribution of data, devoid of skewness (see section 5.4). Subsequent correlation analyses uncovered numerous statistically significant correlations at the 99% and 95% confidence intervals. Notably, the correlation and regression analyses both proved the statistical significance of the interaction variable, the combination of business model novelty and cost-leadership strategy, with the dependent variable, Growth in FTE (Full Time Equivalent Employees). The correlation analysis indicated a positive and moderate correlation between this interaction variable and the dependent variable, Growth in FTE (0.315, at 95% confidence interval). The significant results were further substantiated by the regression analysis, which yielded a p-value of 0.020, falling below the 0.05 threshold, signifying the significance of this relationship. On the other hand, no statistical significance was found for any of the variables when examining the other dependent variable, the change in revenue. Despite not fulfilling all predictions (based on the hypotheses presented, see section 3.2.1), this study also acknowledges potential limitations that, if addressed, may reveal additional significant relationships and a better understanding of the factors influencing the startup performance. Essentially, this study establishes a significant and positive relationship between the combination of business model and competitive strategy on the startup performance. Regarding Dutch high-tech startups, it implies a significant increase in workforce size in the early stages of startup expansion when these businesses employ novel business models in conjunction with a low-cost strategy, and startups utilized the available resources in a novel way to stay competitive. Consequently, these results answer the fourth sub-research question, indicating there is a boost in the firm performance (organizational growth) when business models and competitive strategies are used in combination.

Each of the specifically developed sub-research questions provides an exhaustive answer to the overarching main research question. The in-depth literature review, meticulous statistical analysis, and following established guidelines and principles lead to answering the research question. This study contributes substantively to the existing body of knowledge on business models, competitive strategies, and firm performance within the context of high-tech startups in the Netherlands. The research conducted concludes with a strong finding: there is substantial evidence supporting the influence of BM's in combination with competitive strategies on the performance of high-tech startups in the Dutch landscape. This research thus aims to fill up important gaps in the literature by offering statistical data. In particular, the research indicates that the combination of several BM and CS acts as a stimulant for the growth of startups. As a result, this research broadens the understanding of the dynamic interactions between CS, BM, and startup performance while confirming established theories (such as Zott and Amit [2008]). The evidence presented in this research thus adds depth and empirical weight to the discussion on factors influencing the success trajectory of high-tech startups. This research highlighting the successful strategic choices boosting a startup's growth will aid not only startups but will also enhance the existing understanding of managers, executives, VC's, and policymakers on the topic of BMI and CS. The findings of the research also open up new avenues for investigation, urging the study to examine specific business model types, competitive strategies, and performance outcomes for high-tech startups. Further examination of external factors and longitudinal studies might give further insight into the long-term viability and adaptability of specific strategies for high-tech startups. Examining the impact of organizational culture and leadership on strategic choices and performance provides another interesting route for researchers, leading to a more comprehensive understanding of startup success in a changing business context. This intricate network of factors affecting high-tech startups provides various opportunities for ongoing exploration and research.

In conclusion, this study delves into the complexities of high-tech startups in the Netherlands, expanding to the body of knowledge by shedding light on the intricate interplay between business model designs, competitive strategies, and their influence on the firm's performance outcomes. The study examined the strategic choices taken by these startups in their pursuit of growth in the setting of a highly competitive and globalized world. The research findings provide vital insights into the factors defining success for high-tech firms, especially within the unique business setting of the Netherlands, by unraveling the links between strategic choices and performance outcomes. This study thus provides a comprehensive analysis, laying the groundwork for future studies and strategic considerations for startups navigating the intricacies of today's business world.

7.1. Limitations and Future Research

While this study has effectively confirmed key findings, it is critical to understand the probable limitations that call for a careful evaluation. Even while this research adds to the understanding of high-tech startup dynamics, it is still necessary to recognize areas for advancement and identify particular constraints. The validation of the research's findings serves as a catalyst for discussing the next stages in scientific research, demanding careful examination of potential limitations and prospective research opportunities. Recognizing the possible limitations of this research work, one notable constraint is the relatively small sample size of 49 valid participants. When doing quantitative research on this topic, this sample size falls short of the typically used sample size of 100. It is, therefore, critical to interpret our findings with a slight limitation, acknowledging the potential influence on the generalizability of the conclusions based on the small sample size. A larger sample size improves the generalizability of research findings by providing a solid representative and reliable foundation for making conclusions about the broader population. A larger sample size will add to the robustness and validity of the research findings by increasing participant variety and statistical power.

Another limitation emerged during the exploratory factor analysis (EFA) phase, specifically concerning the variable "BM novelty," which yielded two components, and the subsequent reliability analysis revealed acceptable yet low scores for a few variables, raising concerns about the dependability of the measurement. To address this limitation, future research should emphasize the refining of the survey-questionnaire, such that it is specifically designed for high-tech startups. Tailoring questions to the unique environment of startups offers the potential to reduce reliability issues while also improving the efficacy of the measurements. Interviews can be conducted with startups to gather comprehensive insights into the utilization of business models and competitive strategies among Dutch startups. These interviews would focus on understanding the specific business model themes and competitive strategies employed by startups, rather than solely using existing survey questions, as these questions might have become obsolete, as the same questions are used by most authors researching this topic. The information gathered from these interviews can thus inform the formulation of a questionnaire tailored to the needs and characteristics of the startups, enhancing the relevance and effectiveness of the data collection.

In future research, it would be beneficial to address the low reliability observed in the measures of initial and current differentiation strategy, as indicated by Cronbach's alpha value of 0.318 for both. This suggests that the items used to measure the Differentiation Strategy variable may not adequately capture the construct, leading to lower construct validity. To mitigate this limitation, researchers could consider increasing the number of questions related to dif-

ferentiation strategy in the survey questionnaire. Additionally, more appropriate and targeted questions could be developed to more accurately assess the differentiation strategy employed by startups, thereby enhancing the reliability and validity of the measurements.

Furthermore, using a mixed-methods strategy that integrates qualitative and quantitative research design methodologies might enhance the robustness of the research design. Case studies, or a longitudinal analysis, would further provide a deeper understanding of how business models, strategies, and their combination impact startup performance over time. This multidimensional approach not only will deepen the understanding of the concepts but also will capture qualitative details, that quantitative data alone might miss. Case studies will provide in-depth insights into real-world settings, enhancing research reliability by offering rich contextual details and enabling a nuanced understanding of the complicated phenomena: the effect of the combination of business models and strategies on firm performance. Consequently, a longitudinal study will provide temporal depth to help improve the construct validity by capturing the dynamic evolution of variables across time and generating a more complete picture of the causal relationships between the variables.

Future research could also explore the possibility that startups, not adhering to a specific strategy, might be employing the Focus strategy in conjunction with either cost-leadership or differentiation strategies. Given that the Focus strategy is typically utilized in combination with other strategic approaches, rather than independently, a promising avenue for future investigation would involve incorporating questions into the questionnaire to ascertain whether startups have employed the Focus strategy alongside either cost-leadership or differentiation strategies. This inquiry would provide additional clarity on the strategic preferences of startups and how these choices evolve over time, potentially shedding light on the effectiveness of different strategic approaches in the early stages of startup development.

Looking forward, future research endeavors can also consider extending the study's conclusions to different geographical locations, thereby fortifying the generalizability of the findings. Investigating whether the identified combination of business models and strategies holds true in diverse contexts would enrich the understanding of a startup's success factors. Furthermore, a sector-specific exploration, focusing on one particular industry, for instance, manufacturing or IT or renewable energy, etc., could unveil nuanced variations in optimal combinations of business models and strategies. Delving into these avenues would not only advance the current insights but also offer tailored guidance for entrepreneurs, based on industry-specific considerations. Moreover, future research might also look into the mediating or moderating effects with additional variables that were not considered in this study. Factors such as entrepreneurial talents, extrinsic conditions, or industry-specific dynamics can all have a substantial impact on the relationships between competitive strategies, business model innovation, and startup performance. This study investigates both, the developments made and the areas where additional research is needed, paving the way for a more sophisticated and thorough grasp of the intricate relationship between business models, competitive strategies, and performance outcomes in the high-tech startup landscape, to assist startups in growing successfully.

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A

Appendix A

A.1. Business Model Canvas

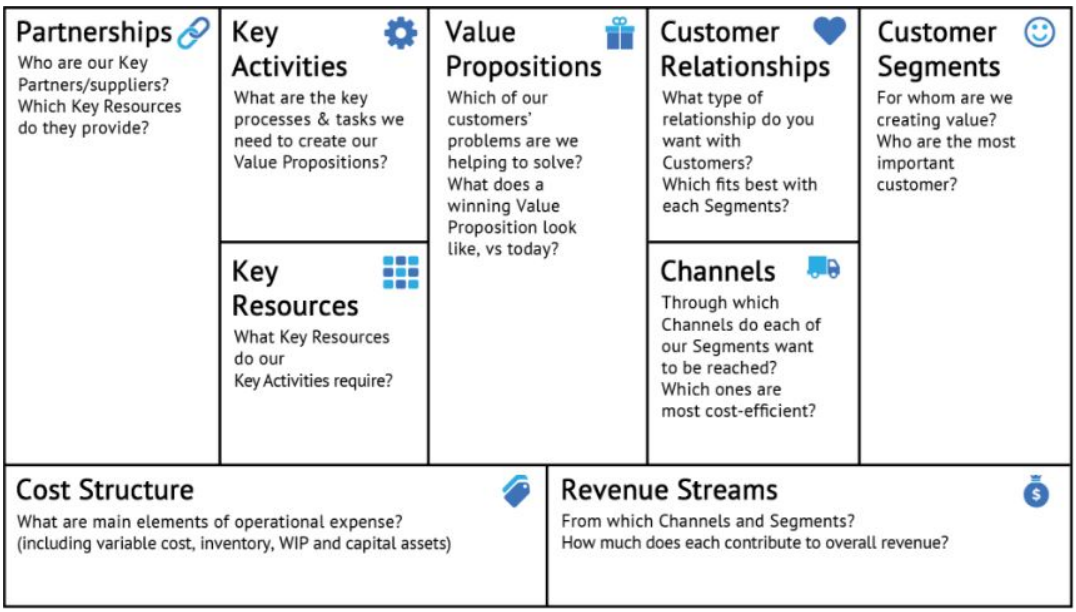

Figure A.1: Business Model Canvas

The Business Model Canvas as shown in figure A.1, consists of nine elements that collaborate to provide the maximum value to the customer and company. The implication of these elements is as follows [Athuraliya, 2022]:

1. **Value Proposition:** This block determines the value provided by the company to its customers. It represents the unique solution or additional value to the challenge faced by the customer with respect to the existing products or services available in the marketplace.
2. **Customer Segments:** Indicates the target audience for the specific product or service. Segmenting the customers based on factors such as geographical location, gender, age,

behaviours, interests, and so on allows firms to better satisfy the customer needs, particularly by tailoring the solution provided to them.

3. **Channels:** Indicates the manner in which the company interacts with its clients. Channels play an important role in increasing client's awareness of the product or service and its value propositions. Channels can also be utilized to provide clients with a way to buy products or services and also for post-purchase support.
4. **Customer Relationships:** Guides the relationship between the consumer and organization via a customer journey map. It aids in identifying the many stages that customers go through when dealing with the organization. This provides the organization with knowledge on attracting, retaining, and boosting its customer base.
5. **Revenue Streams:** The way to generate profits for the company is by selling their product or services to the customers. Revenue streams are based on revenue models, which can be transaction-based, one-time payments made from the customers, or recurring revenue-based, where customers continue the services provided to them for a longer duration.
6. **Key Resources:** The resources necessary to develop and fulfill the value proposition, earn revenue, maintain customer relationships, and reach target markets.
7. **Key Activities:** The activities or tasks that the organization must carry out in order to offer its value proposition, earn revenue, maintain customer relationships, and reach target markets.
8. **Key Partnerships:** The alliances that the businesses must form to support their main operations. These partnerships can be Strategic alliances between non-competitors, strategic partnerships between competitors, joint ventures to develop new businesses, or buyer-supplier relationships to ensure reliable supplies.
9. **Cost Structure:** Consists of the expenses linked with operating the business model. It concentrates on calculating the cost of developing and delivering the value propositions, generating revenue, and maintaining relationships with the customers.

A.2. Case Study: Ryanair

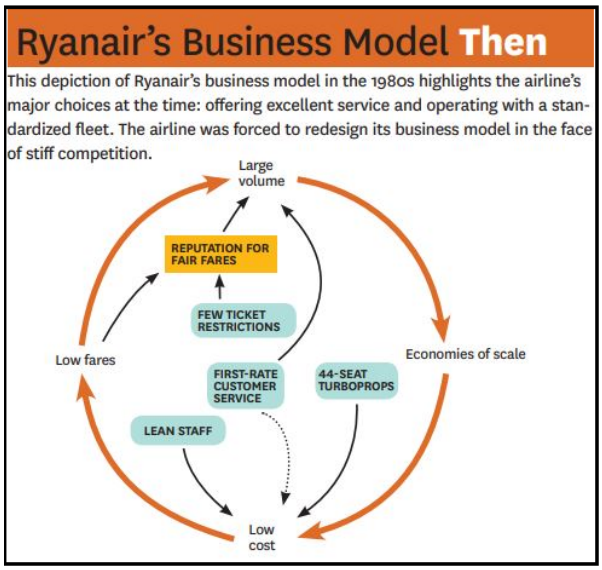

Figure A.2: Ryanair Business Model (Old)

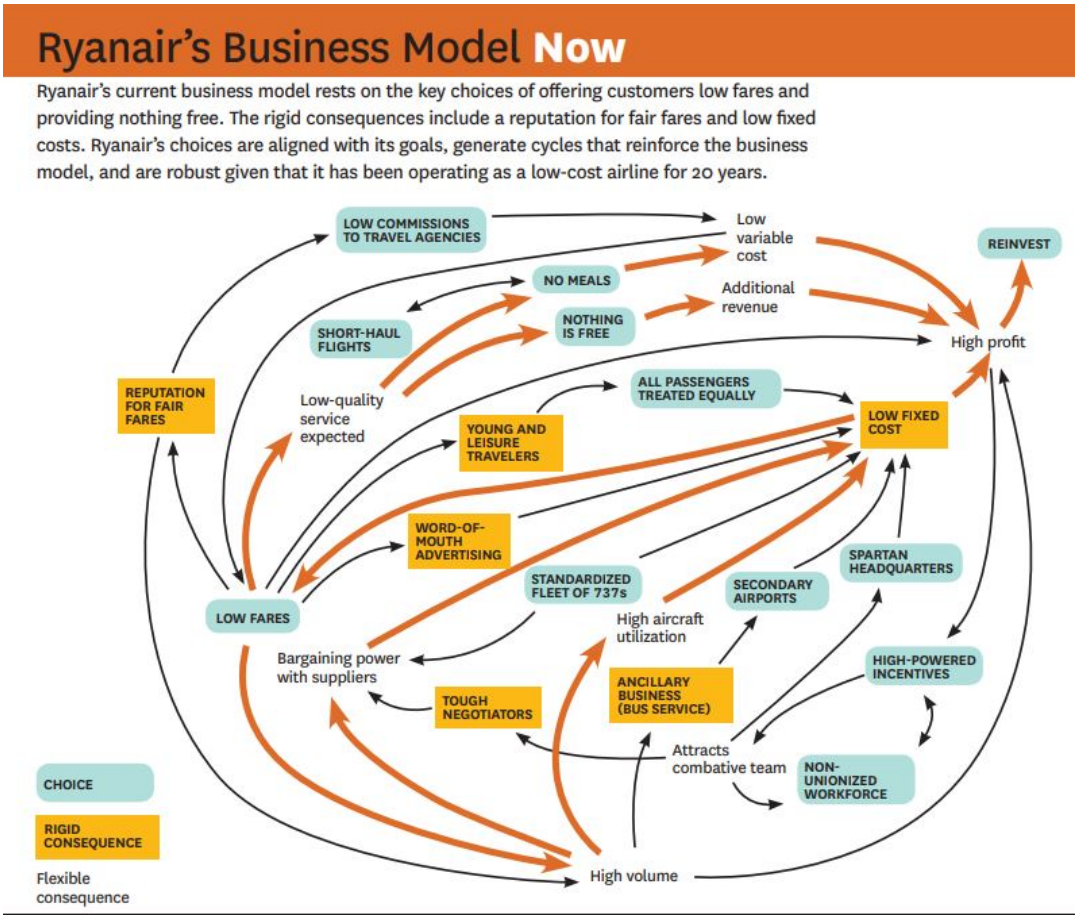

Figure A.3: Ryanair Business Model (New)

Choice		Consequence
Secondary airports	→	Low airport fees
Lowest ticket prices	→	Large volume
Low commissions to travel agents	→	Low cost
Standardized fleet of 737s	→	Bargaining power with suppliers
Single-class	→	Economies of scale
High-powered incentives	→	Attracts combative team
No meals	→	Faster turnaround
Nothing free	→	Additional revenue
Spartan headquarters	→	Low fixed cost
No unions	→	Flexibility in rostering staff

Figure A.4: Choice taken and the subsequent decision of implementing the novel business model

A.3. Descriptive Statistics

A.3.1. Skewness and Normal Distribution

The figures provide the normal distribution curve, mean, skewness and the standard deviation of all the variables-

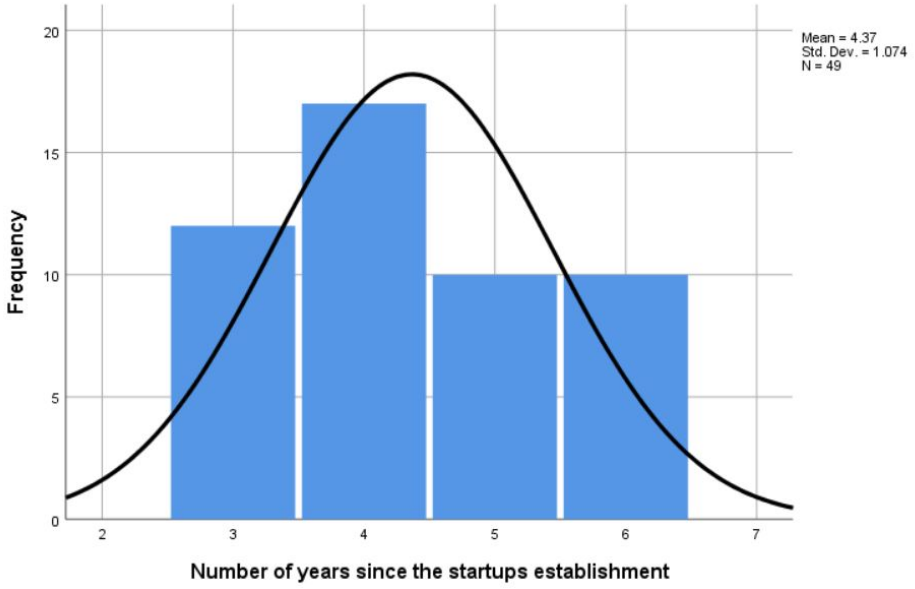

Figure A.5: Firm Age

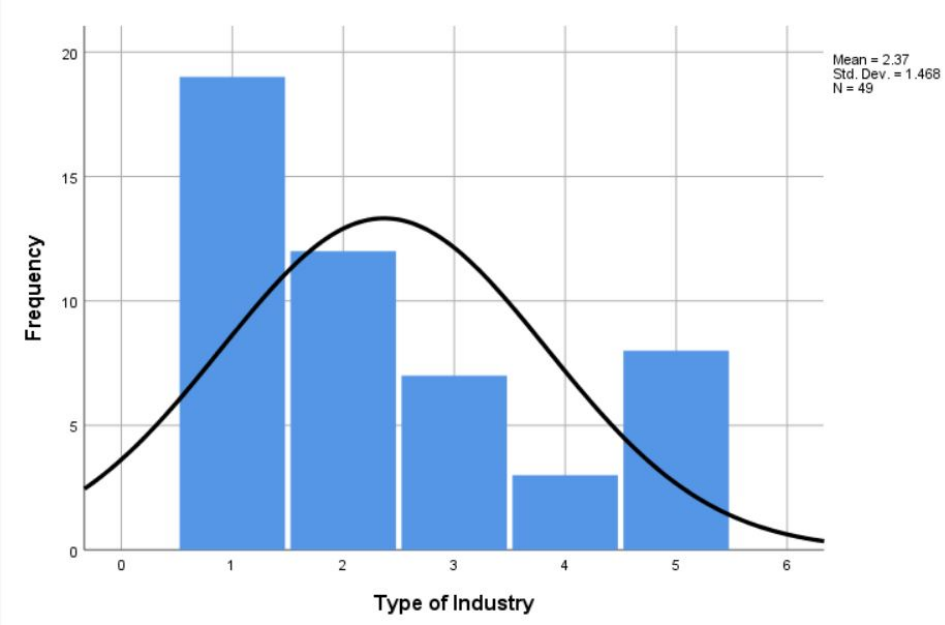

Figure A.6: Industry

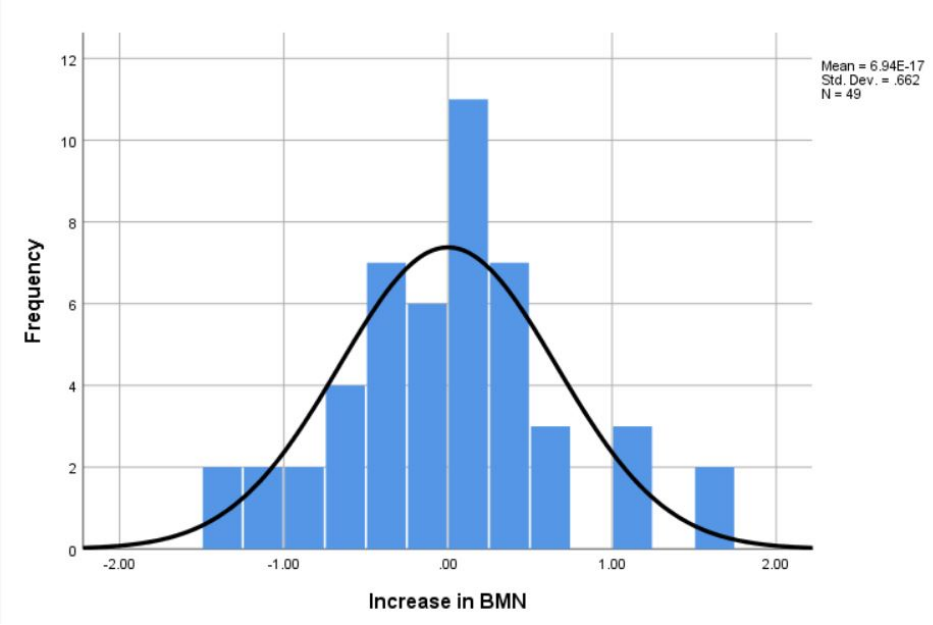

Figure A.7: Increase in Business Model Novelty

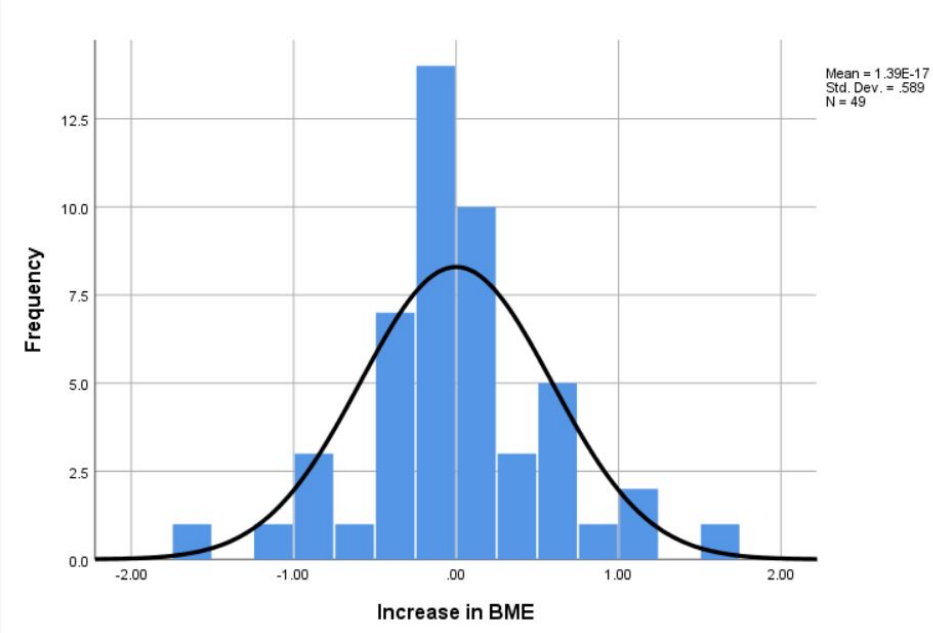

Figure A.8: Increase in Business Model Efficiency

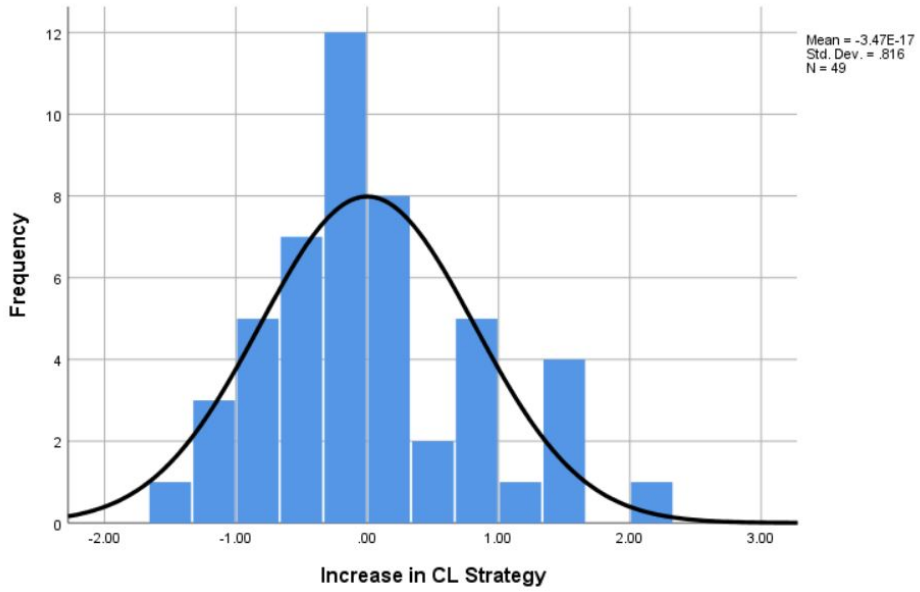

Figure A.9: Increase in Cost-Leadership Strategy

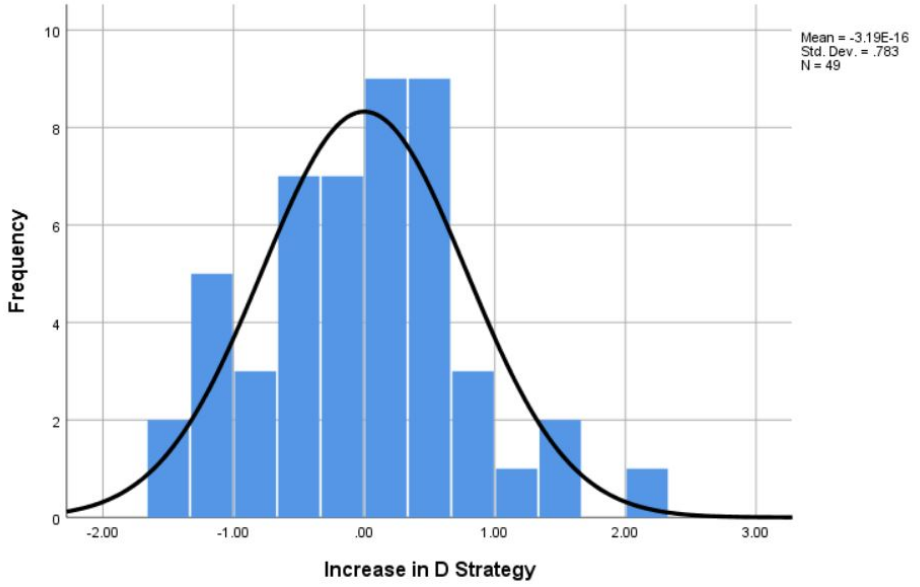

Figure A.10: Increase in Differentiation Strategy

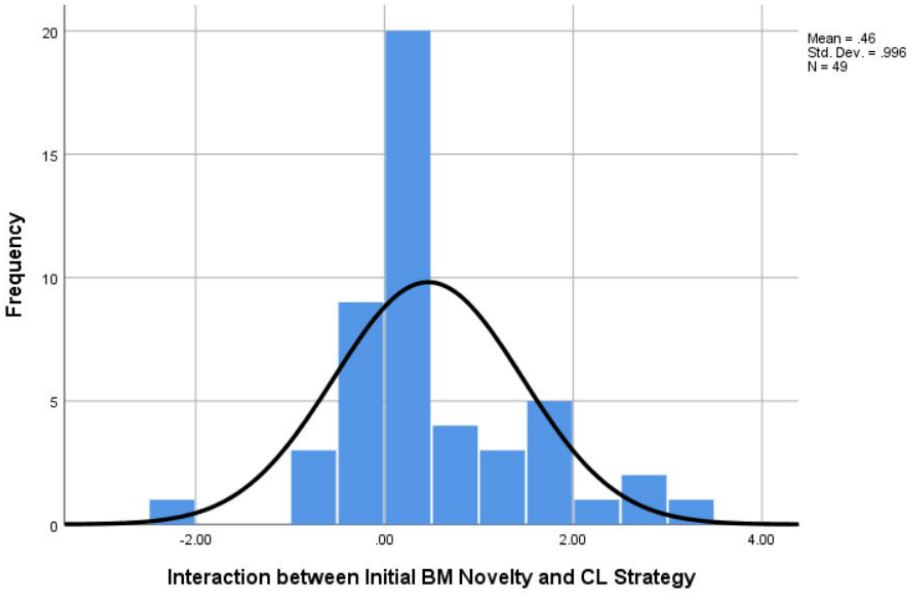

Figure A.11: Interaction effect Business Model Novelty and Cost-Leadership strategy

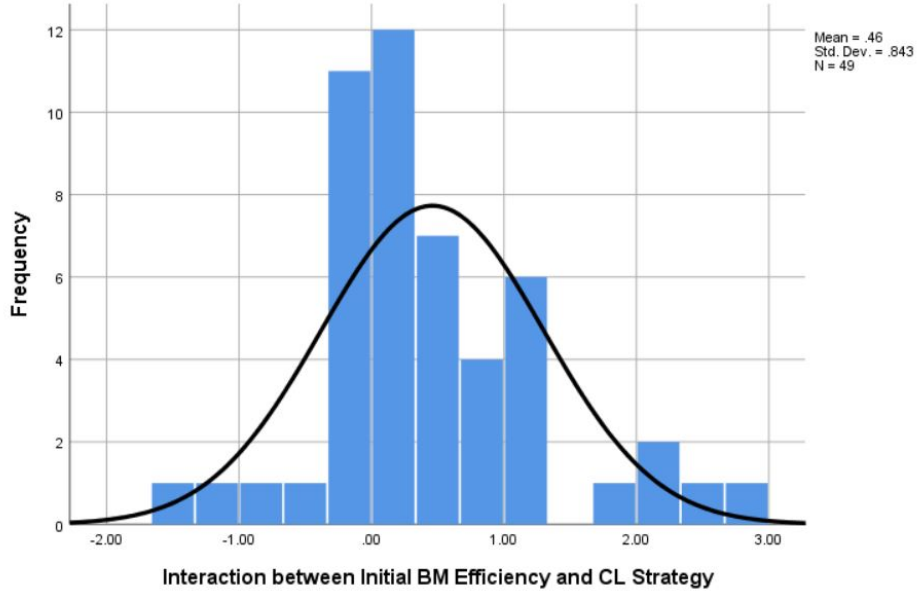

Figure A.12: Interaction effect Business Model Efficiency and Cost-Leadership strategy

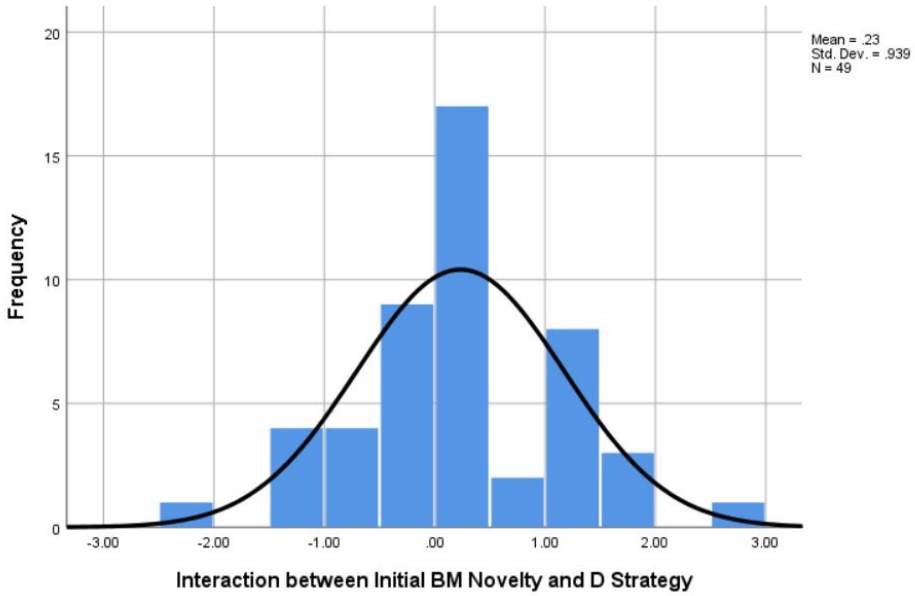

Figure A.13: Interaction effect Business Model Novelty and Differentiation strategy

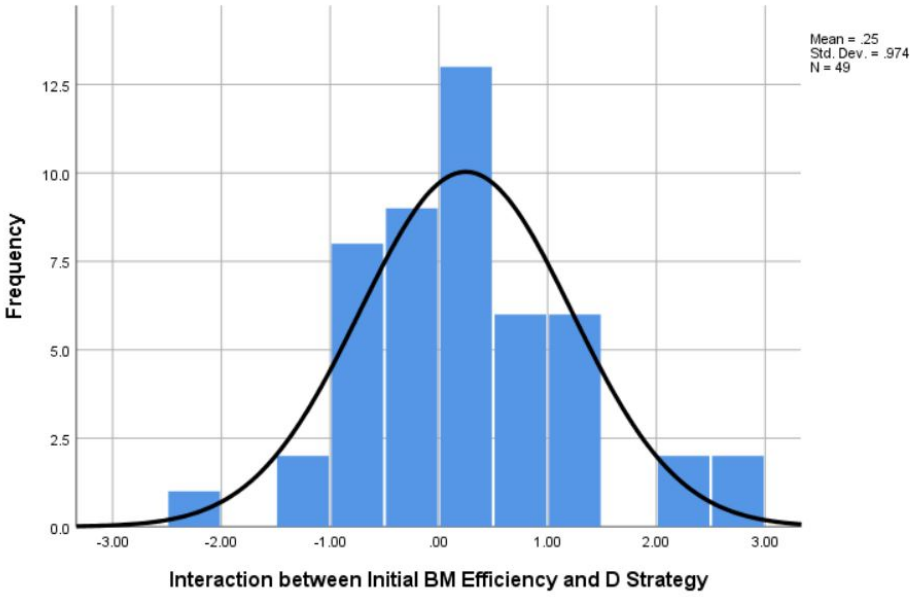

Figure A.14: Interaction effect Business Model Efficiency and Differentiation strategy

A.3.2. Categorizing Dependent Variables

The dependent variables, Growth in FTE and Change in Revenue are categorized based on the distribution and the values obtained from the startups. To not lose relevant information, appropriate and relevant categories were formulated, keeping in line with the research. As seen in table A.1, startups that did not have an increase, or had a decrease in their growth in terms of number of employees, that is the values ”0” and ”-17.23” were categorized together and labeled indicating ”No Growth.” While the values above ”0”, that is- 5, 20.82,25.45, 26.19,

32.81, 41.09, 45.98, 67.59, 75.54- were categorized to indicate ”Significant Growth.” Further the table A.2, depicted three categories for the ”Change in Revenue” variable- ”No Revenue”, indicated by the ”0” value, ”Slight Increase in Revenue” indicated by both ”13” and ”38”, and lastly, ”Significant Increase in Revenue” looks at the values ”63, 88, and 113.”

Growth in FTE	
Value (in %)	**Count of Startups**
-17.23	1
0	21
5	2
20.82	2
25.48	7
26.19	1
32.81	5
41.09	2
45.98	3
67.59	3
75.54	2
Grand Total	**49**

Table A.1: Percentage Change in FTE across startups

Change in Revenue	
Value (in %)	**Count of Startup**
0	14
13	13
38	6
63	3
88	2
113	11
Grand Total	**49**

Table A.2: Percentage Change in Revenue across startups

A.4. Regression Analysis

A.5. Hypothesis Table

Hypothesis	Result	Significance
H1b: Increase in efficiency-centered business model design is positively associated with the growth in the number of FTE	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups Increase in BM efficiency does not significantly contribute to the Change in revenue
H2b: Increase in novelty-centered business model design is positively associated the startup's change in revenue	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups Increase in BM Novelty does not significantly contribute to the Change in revenue
H3b: Increase in cost-leadership strategy is positively associated with the startup's change in revenue	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups Increase in Cost-Leadership Strategy does not significantly contribute to the Change in revenue
H4b: Increase in differentiation strategy is positively associated with the startup's change in revenue	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups Increase in Differentiation Strategy does not significantly contribute to the Change in revenue
H5b: Interaction between novelty-centered business model design and cost-leadership strategy is positively associated with the startup's change in revenue.	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups the combination between BM novlety and cost-leadership strategy does significantly contribute to the Change in revenue
H6b: Interaction between efficiency-centered business model design and cost-leadership strategy is positively associated with the startup's change in revenue	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups the combination between BM efficiency and cost-leadership strategy does significantly contribute to the Change in revenue
H7b: Interaction between novelty-centered business model design and differentiation strategy is positively associated with the startup's change in revenue	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups the combination between BM novlety and differentiation strategy does significantly contribute to the Change in revenue
H8b: Interaction between efficiency-centered business model design and differentiation strategy is positively associated with the startup's change in revenue	p > 0.05; Null Hypothesis Accepted	For Dutch high-tech startups the combination between BM efficiency and differentiation strategy does significantly contribute to the Change in revenue

Figure A.15: Hypotheses Table: Change in Revenue

A.6. Line-Fit Plot

Figure A.16 illustrates the Line-Fit plot, showcasing the relationship between the interaction effect variable, ”Initial BM Novelty * Initial Cost-leadership Strategy,” and the dependent variable, ”Growth in FTE,” without categorizing the growth in FTE variable. This plot provides the line-equation, y = 0.16 + 0.08x, where the y-intercept of 0.16 signifies the average growth in FTE when the interaction effect variable (between initial BM novelty and initial cost-leadership strategy) is zero, and the slope of 0.08 indicates the average additional growth in FTE for every unit increase in the interaction effect variable. Thus, the plot suggests that a positive increase in initial BM novelty and initial cost-leadership strategy correlates with positive growth in FTE, with the strength of this influence dependent on the slope value.

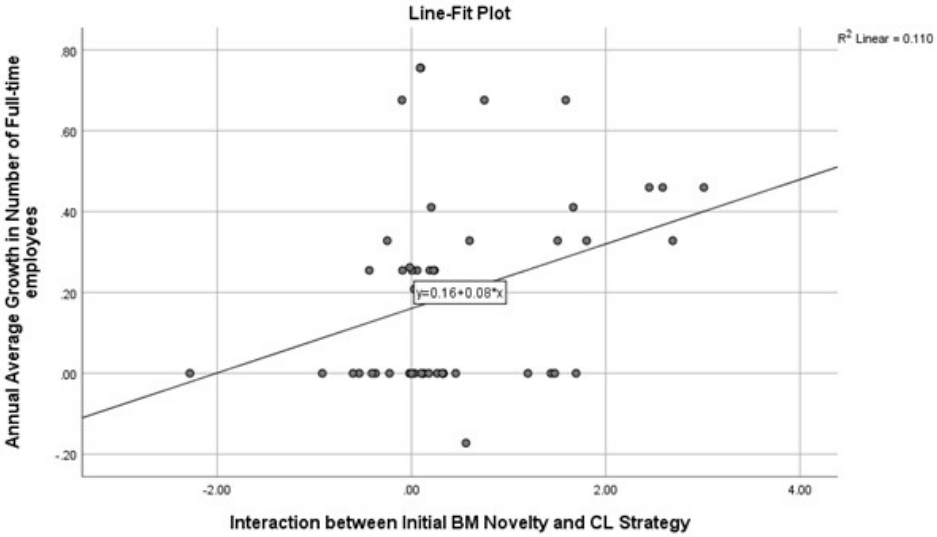

Figure A.16: Line-Fit Plot: Growth in FTE (before categorization)

A.7. Additional Analysis

A.7.1. Industry Outlook

Additional descriptive analysis was conducted to assess the impact within each industry sector and across startup cohorts from 2017 to 2020. This additional examination unveiled distinct trends observed among startups within each sector and elucidated patterns unique to startups established in different years. This comprehensive analysis provides valuable insights into the nuanced dynamics that shape the trajectory of startups across diverse industries and time-periods, laying the foundation for future research endeavors. It empowers authors to explore trend shifts within each sector by conducting in-depth analyses of high-tech startups operating within specific industries. The figures below are the descriptive analysis performed depicting the dynamic industry outlook.

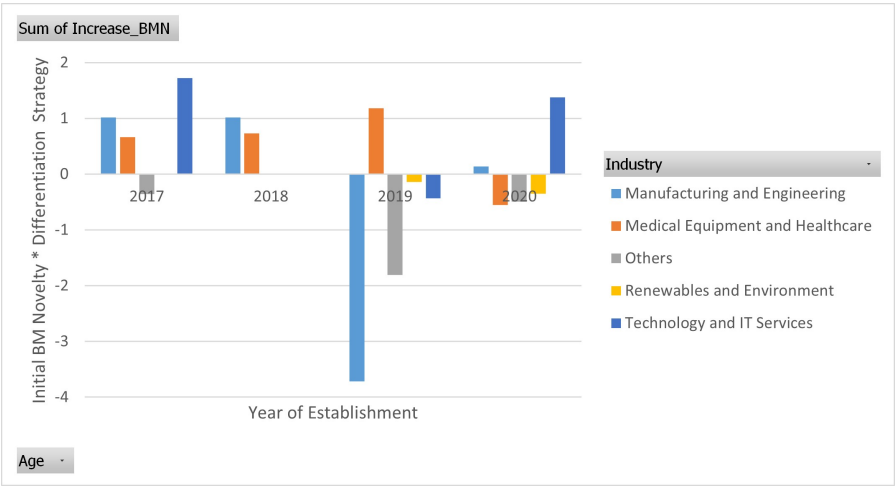

Figure A.17: Industry Trends for each year: Increase in BM Novelty

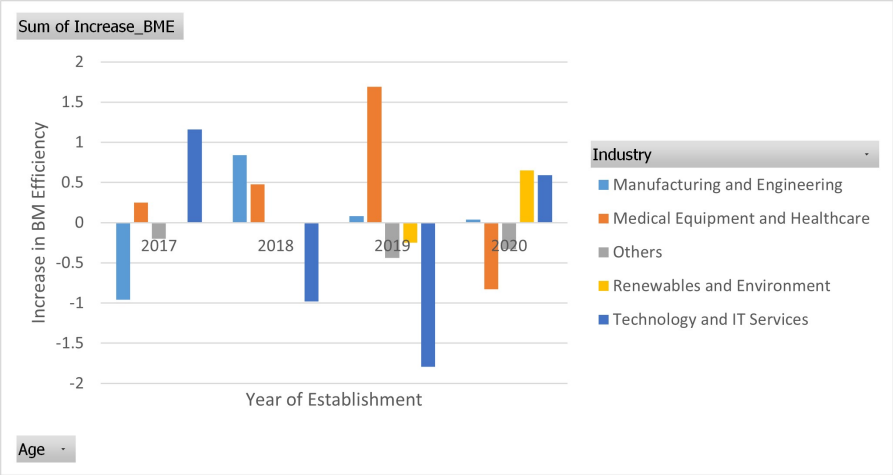

Figure A.18: Industry Trends for each year: Increase in BM Efficiency

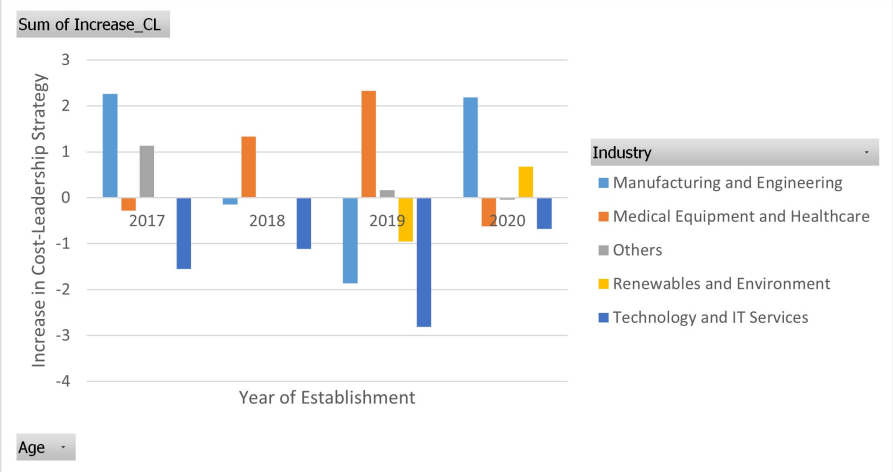

Figure A.19: Industry Trends for each year: Increase in Cost-Leadership strategy

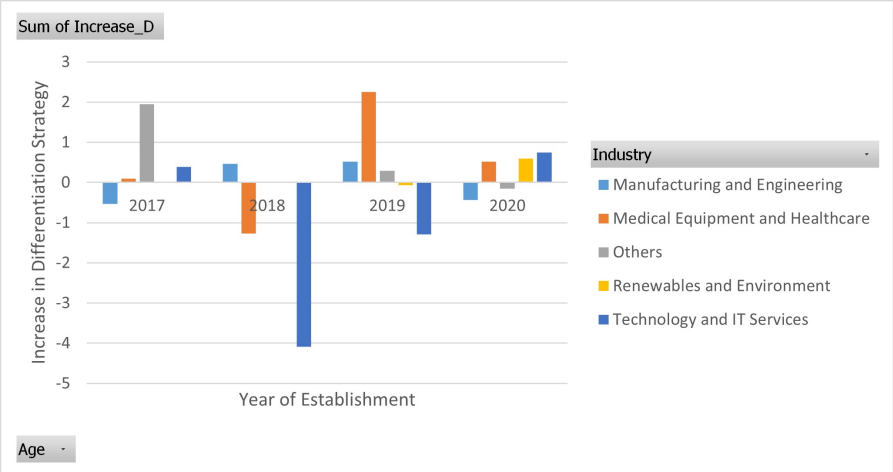

Figure A.20: Industry Trends for each year: Increase in Differentiation strategy

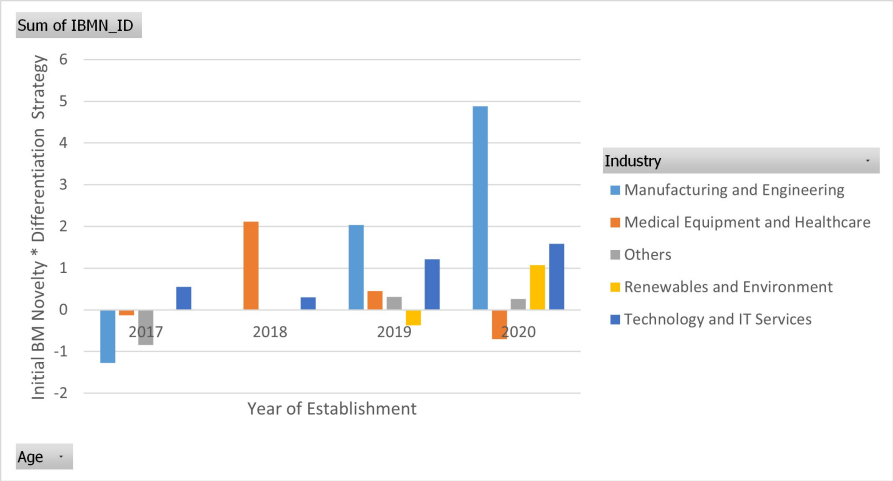

Figure A.21: Industry Trends for each year: BM Novelty * Differentiation strategy

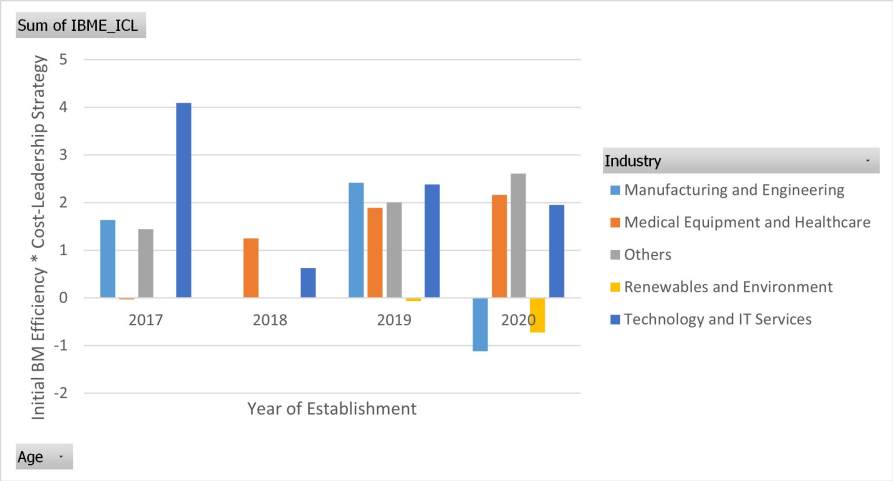

Figure A.22: Industry Trends for each year: BM Efficiency * Cost-Leadership strategy

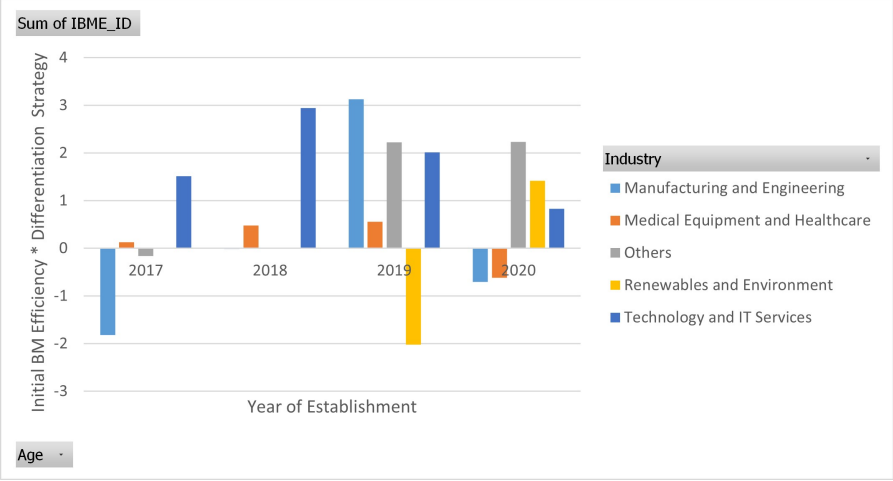

Figure A.23: Industry Trends for each year: BM Efficiency * Differentiation strategy

B

Appendix B

B.1. Survey Questionnaire

1. What is the name of your company?

2. When was the company established (mention the year)?

3. Number of full time employees at the company when it was founded?

    - Less than 8
    - Between 8 - 20
    - Between 21 -50
    - More than 50

4. Number of full time employees at the company now?

    - Less than 8
    - Between 8 - 20
    - Between 21 -50
    - More than 50

5. Our company's initial business model for introducing items or services to the market focused on:

Description	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
Offering new combinations of products, services and information to its customers					
Integrating a wide variety of stakeholders and products					
Linking customers to the products and services in uncommon ways					
Continuously introducing innovations to make the business model more effective					
Creating a unique business model					
Simplifying the transactions between customer and the company					
A low error rate in the execution of the transactions					
Minimizing stakeholder costs (marketing, sales, transactions)					
Handling small as well as large transaction volumes					
Offering high transaction efficiency					

6. Currently (today) the business model of our company focuses on:

Description	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
Offering new combinations of products, services and information to its customers					
Integrating a wide variety of stakeholders and products					
Linking customers to the products and services in uncommon ways					
Continuously introducing innovations to make the business model more effective					
Creating a unique business model					
Simplifying the transactions between customer and the company					
A low error rate in the execution of the transactions					
Minimizing stakeholder costs (marketing, sales, transactions)					
Handling small as well as large transaction volumes					
Offering high transaction efficiency					

7. To enter the product or service in the market, our company is focusing/focused on:

Description	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
Offering products/ services at low/lower prices than competition					
Minimizing product/ service-related expenditure, in particular using process innovations					
Emphasizing economies of scale and scope with products and services					
New product development, Innovation and R&D activities					
Branding and advertising as part of company's marketing approach					
Emphasizing growth by collaborating or merging with R&D/ technology intensive companies					

8. Currently (today) our company is focusing on:

Description	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
Offering products/ services at low/lower prices than competition					
Minimizing product/ service-related expenditure, in particular using process innovations					
Emphasizing economies of scale and scope with products and services					
New product development, Innovation and R&D activities					
Branding and advertising as part of company's marketing approach					
Emphasizing growth by collaborating or merging with R&D/ technology intensive companies					

9. How has the revenue of your startup changed since the implementation of the business model and strategy at the time of market entry and now?

    - Significant Increase
    - Slight Increase
    - Neither Increase or Decrease
    - Slight Decrease
    - Significant Decrease
    - Not Applicable

10. Which of the following would represent the range of this percentage change?

    - 0% to 25%
    - 26% to 50%
    - 51% to 75%
    - 76% to 100%
    - More than 100%
    - Not Applicable